AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

Reg. U. S. Pat. Off.

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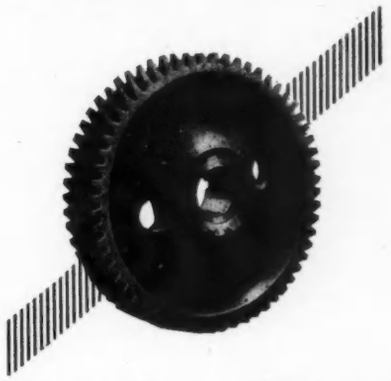
TEXTOLITE TIMING GEARS



What Price Silence?

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- **They are now quieter than ever, thanks to new tooth forms and improved methods of cutting.**
- **They embody a new gear design which effects an astonishing reduction of resonance—a result of dampening in the blank itself, which employs two materials of opposing periods.**

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AUTOMOTIVE INDUSTRIES

Vol. 69, No. 11 • THIRTY-FIFTH YEAR • September 9, 1933

August Output Places Industry Ahead of 1932 12-Month Total

Sustained sales through summer keep dealer stocks at moderate levels despite fast production pace—Production for year may approximate 2,000,000 units

by Don Blanchard

Editor, Automotive Industries

MOTOR vehicle production in the first eight months of of 1933 approximated 1,510,000 as compared with 1,431,000 in all of 1932 and with 1,122,124 in the corresponding period last year. If output in the last four months follows the industry's normal seasonal pattern, the total for 1933 may well verge on the 2,000,000 mark.

August production was in the neighborhood of 225,000, a decline of slightly more than usual seasonal proportions from the July total of 240,000 but a gain of 140 per cent over the 94,000 units produced in August, 1932.

Although no registration data are available for August as yet, factory reports of retail sales indicate that they held up remarkably well during the month just ended. Consequently it is fair to assume that there was no appreciable build-up in dealer stocks during the month and, inasmuch as inventories at the end of July did not represent much more than a 30-day supply, it does not appear likely that the clean-up of 1933 models now getting under way will occasion any difficulty.

Some further output curtailment is to be expected in the immediate future. Normal seasonal influences which the industry was successful in overcoming during the summer months, are beginning to make themselves felt. Moreover, the season for model introduction is here as the Packard announcement in this issue indicates and the necessary changeovers will operate to reduce output. However, the present outlook is that the uptrend in manufacturing operations will be resumed before the end of the year as the new models get under way.

The immediate sales outlook is, of course, obscured by the many uncertainties on the horizon. It is too soon to attempt to estimate the effects of the Government's economic experiments and until a more definite evaluation of such effects can be made, speculation on future sales possibilities is more or

U. S. New Car Registrations and Estimated Dollar Volume by Manufacturing Groups—First Seven Months of 1933 and 1932

	Percentage of Total Units		Percentage of Total Estimated Dollar Volume	
	1933	1932	1933	1932
Chrysler Corp.	23.6	17.4	21.8	17.3
Ford and Lincoln	19.8	24.7	17.3	15.8
General Motors	46.2	44.9	48.3	43.3
All Others	10.4	13.0	12.6	23.6
	100.0	100.0	100.0	100.0

U. S. Registrations of New Passenger Cars and Estimated Dollar Volume by Retail Price Classes—July, 1933, and 1932

	Units				
			Per Cent of Total		Per Cent
	1933	1932	1933	1932	Change
Chevrolet, Ford and Plymouth	129,636	76,271	69.9	73.4	+56.9
Others under $750	32,014	6,261	17.2	6.0	—48.9
$750-$1,000	14,462	13,776	7.8	13.2	+ 5.0
$1,000-$1,500	6,226	4,584	3.4	4.4	+35.9
$1,500-$2,000	1,151	1,573	0.6	1.5	—26.8
$2,000-$3,000	1,653	1,021	0.9	1.0	+61.9
$3,000 and over	464	480	0.2	0.5	— 3.3
Total	185,606	103,966	100.0	100.0	+78.5
Miscellaneous	54	222			
Total	185,660	104,188			

	Estimated Dollar Volume				
			Per Cent of Total		Per Cent
	1933	1932	1933	1932	Change
Chevrolet, Ford & Plymouth	$72,000,000	$45,000,000	60.0	60.0	+60.0
Others under $750	21,000,000	4,000,000	17.5	5.3	+425.0
$750-$1,000	12,000,000	12,000,000	10.0	16.0	None
$1,000-$1,500	7,000,000	6,000,000	5.8	8.0	+16.7
$1,500-$2,000	2,000,000	3,000,000	1.7	4.0	—33.3
$2,000-$3,000	4,000,000	3,000,000	3.3	4.0	+33.3
$3,000 and over	2,000,000	2,000,000	1.7	2.7	None
Total	$120,000,000	$75,000,000	100.0	100.0	+60.0

less idle. Fortunately during this period of uncertainty the industry finds itself in a generally sound inventory position and by the time it is necessary to set production schedules and prices for next year's models, many of the existing uncertainties should be cleared up so that forecast of probable markets can be made more confidently.

United States registrations of new passenger cars at the end of seven months were 868,027 against 767,813 in the same period last year, a gain of 13.1 per cent. The 1933 registration figures, however, do not provide as accurate a measure of retail sales as they have in previous years due to the large number of states in which there was a complete change of personnel in the registrar's office as a result of political upsets. Actual sales almost certainly have been 10 per cent larger than the registration figures indicate so that the seven-month sales total is really about 960,000, an increase of 24 per cent over last year.

Attention is called to this lag in the registration figures, some of which will be corrected in the remaining months of the year, because estimates of dealer inventories of new cars based on registration data show a steady and substantial increase. Actually, however, if there has been any increase in inventories in the last four or five months, it has been very small and fully justified by the higher level of sales. At the end of July, the inventory probably was not much in excess of 200,000 passenger cars, which was about the level at the same time a year ago.

In interpreting the accompanying estimates of United States retail dollar volume, these errors in registration data should also be born in mind. Using the registration figures, August retail dollar volume is estimated at $120,000,000 as compared with $75,000,000 last year, an increase of 60 per cent and comparing with $114,000,000 in June. The total estimated dollar volume for the first seven months is $577,000,000 as compared with $598,000,000 in the same period last year. The loss amounts to 3.5 per cent but if more accurate sales data were available for use in making the estimates, this small loss would unquestionably be converted into a slight gain.

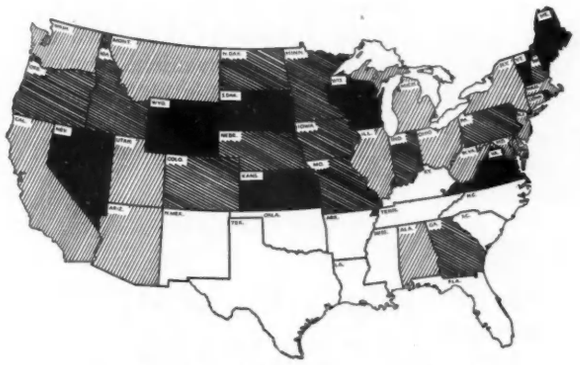
The fact that comparisons on the dollar basis do not show up so well as on the unit basis, however, serves to emphasize the continued dominance of the low-priced car in the 1933 market. Ford, Chevrolet and Plymouth are estimated to have accounted for 56.5 per cent of the dollar volume in the first seven months as compared with 46.5 per cent in the same period last year. In units, these three leaders got 68.2 per cent of the business against 61.7 per cent last year. Other makes listing under $750 showed increases of the order of 150 per cent both in units and dollars over 1932. All price groups above the $750 line, on the other hand, are far below last year in both money and cars sold.

U. S. Registrations of New Passenger Cars and Estimated Dollar Volume by Retail Price Classes—First Seven Months of 1933 and 1932

	Units				
			Per Cent of Total		Per Cent
	1933	1932	1933	1932	Change
Chevrolet, Ford and Plymouth	591,581	472,729	68.2	61.7	+25.0
Others under $750	147,379	57,367	17.0	7.5	+157.0
$751-1,000	67,454	136,711	7.8	17.9	—50.6
$1,000-$1,500	39,490	60,077	4.6	7.8	—34.1
$1,500-$2,000	9,095	20,467	1.0	2.7	—56.0
$2,000-$3,000	8,568	13,277	1.0	1.7	—35.4
$3,000 and over	3,632	5,571	.4	.7	—34.8
Total	867,199	766,199	100.0	100.0	+13.1
Miscellaneous	828	1,614			
Total	868,027	767,813			

	Estimated Dollar Volume				
			Per Cent of Total		Per Cent
	1933	1932	1933	1932	Change
Chevrolet, Ford & Plymouth	$326,000,000	$278,000,000	56.5	46.5	+17.2
Others under $750	96,000,000	39,000,000	16.7	6.5	+146.0
$750-$1,000	58,000,000	119,000,000	10.0	19.9	—51.2
$1,000-$1,500	46,000,000	73,000,000	8.0	12.2	—37.0
$1,500-$2,000	15,000,000	34,000,000	2.6	5.7	—55.8
$2,000-$3,000	21,000,000	34,000,000	3.6	5.7	—38.2
$3,000 and over	15,000,000	21,000,000	2.6	3.5	—28.5
Total	$577,000,000	$598,000,000	100.0	100.0	— 3.5

Sales Ahead of Last Year in 37 States at End of Seven Months



On May 1 there were only 11 states ahead of 1932

Car sales ahead of last year in 29 states on July 1

Ahead of 1932

0-15% Behind 1932

15-30% Behind 1932

Over 30% Behind 1932

U. S. New Passenger Car Registrations in the First 7 Months 1933 and 1932 Compared

(Per cent gains and losses in 1933 from 1932)

Alabama	+35.0	Iowa	+ 8.8	Nevada	—16.2	S. Dakota	+ 0.2
Arizona	+32.1	Kansas	+44.8	New Hampshire	— 0.1	Tennessee	+40.1
Arkansas	+42.5	Kentucky	+29.4	New Jersey	+ 4.4	Texas	+47.4
California	+24.3	Louisiana	+25.8	New Mexico	+31.0	Utah	+45.5
Colorado	— 0.5	Maine	—12.0	New York	+ 6.0	Vermont	—22.8
Connecticut	+14.0	Maryland	— 6.7	N. Carolina	+49.4	Virginia	—13.8
Delaware	+17.1	Massachusetts	+ 7.3	N. Dakota	— 5.0	Washington	+11.3
Dist. of Col.	— 3.2	Michigan	+15.6	Ohio	+30.8	West Virginia	+17.2
Florida	+23.0	Minnesota	+ 9.3	Oklahoma	+20.1	Wisconsin	—15.8
Georgia	+33.4	Mississippi	+42.1	Oregon	+19.4	Wyoming	— 2.1
Idaho	+12.8	Missouri	— 5.5	Pennsylvania	+ 3.3		
Illinois	+14.0	Montana	+28.1	Rhode Island	+15.3	Total	+13.1
Indiana	+ 8.7	Nebraska	+ 6.0	S. Carolina	+61.4		

JUST AMONG

Narrow Vision and Broad Views

WE have always been struck by the variance in estimating future possibilities of any given automotive company by men associated with financial interests and by the men closely allied with the industry itself. Sometimes the outside financial observer sees more clearly than those of us who are close to the industrial picture; he isn't so likely to mistake the woods for the trees.

The financial men frequently are more optimistic about the possibilites of a given situation than are the men in the industry. More than once we have heard them comment favorably on chances for quick financial profit in an operation which the experienced executive would shun as an operating venture.

It is quite possible that in the future, as in the past, goodly sums of outside money will be put into automotive ventures on a basis which would make the experienced automotive man gasp—and the outsiders may be right at that!

* * *

Shift of Functions Should Help All

MANY of the simplification and industrial standardization activities of the Bureau of Standards have been turned over to the American Standards Association.

Without setting up as an expert on such matters, we see many definite advantages to this new arrangement and few, if any, objections to it. The American Standards Association embodies as its membership a wide group of technical associations including the Society of Automotive Engineers and for this reason can be expected to hold duplication of effort to a minimum and to strengthen, supplement and coordinate standards activities already being adequately handled by its individual member associations.

Certainly, the A.S.A. will be closer to the history and the operations of standards work throughout the various technical societies than a purely governmental agency and the results of that closeness can scarcely be other than beneficial to all concerned.

* * *

Serious Meetings for Serious Dealers

NEVER in the history of the industry have automobile dealers gone to factory or sectional sales meetings with so serious a mental attitude nor so practical a psychological approach.

More eager than ever to hear about the new models which are coming, they are asking for factual data, stripped of bands and ballyhoo. If factory sales executives could sit in disguise among their dealer audiences this year, they would hear comment on every expense item connected with the meeting; they would sense a passive imperturbability remaining undisturbed by purely "pep" talks; they would hear many casual remarks which summarized say: "Let's get to the point—and then let's get back home to work."

Three years of tough times have made plenty of easy-going dealers into hard-working retailers. When they sit together around a luncheon table at a sales meeting today they are exchanging experiences, relating service difficulties and comparing notes on selling methods. It's hard to pick up more than one or two good funny stories at such a luncheon these days. Most dealers have learned that time is money and they have come for business—not for a good time.

Most factories realize this change that has come about. They are planning their meetings more carefully—packing them full of more work and less play. They are recognizing the obligation which rests on them to do a good business job at a meeting where dealers have been asked to come at their own expense and inconvenience.

And where this obligation is met most fully this fall, there will the best results be obtained.

* * *

Automotive Workers Earnings Are Larger

WITH the labor phases of the NRA code having assumed a position of major importance, it is interesting to know that the actual earnings of workers in the automotive industry in May and June, 1933, compared a good deal more favorably with the earnings for the year 1926 than did those of workers in industry in general.

In 1926, the average weekly earnings in the automotive industry were $26.65; in May, 1933, they were $20.24, and in June, 1933, $22.85.

GOURSELVES

In 1926, the average weekly earnings in the major industries as a group were $23.22; in May, 1933, they were $14.42; and in June, 1933, $15.83.

These figures have just been published by the National Industrial Conference Board and are based on careful research studies by that organization. While later figures are not yet available, it is almost certain that the wage increases put into effect throughout the automotive field since the end of June have brought average weekly earnings at least to the 1926 level, if not above.

This same study shows that the average number of hours actually worked per week in the automotive industry were 50.8 in 1926; 42.0 in May, 1933; and 45.9 in June, 1933.

For industry as a whole, the average number of hours worked in 1926 were 50.2; in May, 1933, were 39.4, and in June, 1933, were 43.1.

* * *

Labor Relations Under NRA

TRAVELING about among the automotive plants last week we found an optimism based on continuance of brisk sales somewhat tempered by uncertainty concerning the final working out of NRA in general and automobile code provisions in particular.

Fears as regards unfavorable labor developments in the next few months unquestionably are in the minds of a number of executives, yet a firm confidence in a constructive working out of coming problems exists in the minds of at least as large a number. The psychological reaction from the winning fight made by the industry for inclusion of its special labor clause in its now-approved code was extremely favorable.

Most executives realize that the greatest practical use of this much debated clause will be to offset untrue statements made by some labor organizers to workers regarding the actual meaning of the code. Most of them recognize, nevertheless, that the only actual bulwark against organization of automotive plants by the labor unions will be the satisfaction of individual employees with relationships as they exist or as they may be set up within individual companies. Many executives did derive a great satisfaction and a renewed courage, however, from the inclusion of the fought-for clause.

* * *

Common Sense Will Provide the Answer

WE have talked with a good many factory executives recently and the question of labor relationships under NRA came into the conversations frequently, as is natural. While every one to whom we talked wished that it hadn't been necessary to sign any code embodying the labor provisions, there was a wide difference of attitude about how the program would work out.

One thing was interesting to us. Fear of calamity because of code labor provisions appeared in almost exactly inverse proportion to the actual factory or shop experience of the executive expressing his ideas. Automotive leaders who once worked with their hands—and a number of the most important are in this group—look with no more favor than the others on the possibilities of having to deal with labor union organizations, but they are far less upset about the situation than are many of their fellow executives.

To these men, labor is not a symbolic word. They think in terms of real flesh and blood men. They held union cards themselves at one time and they know just how much and how little that means. They are neither sentimental nor hard boiled in their thinking; they are merely relaxed—and quietly confident that common-sense will lead them through whatever specific problems may arise.

The more this group predominates in the councils of the industry as regards labor matters the better everybody else will be able to sleep nights and the quicker will be found practical solutions for the problems which undoubtedly are due to arise in the next six months or so.

* * *

Bill Stout's Rail Car

W. B. STOUT at the International Automotive Engineering Congress gave out a few general specifications of the new rail car of unique design which is just being completed in his laboratories. It is 60 ft. long, he said, about 10 ft. wide and 10 ft. high *and weighs, without windows, 5400 lbs!*

Yes, we are going to be interested in hearing more about it, too.—N. G. S.

PACKARD REFINES ITS

Oil Temperature Regulators, 100% Oil Filters, New Steering Gears and Ventilated Generators Are Among Features

by Athel F. Denham
Field Editor, Automotive Industries

FIRST to be announced of the crop of 1934 models, the new offerings of the Packard Motor Car Company present no radical departures from previous practice. Two wheelbases have been added; bodies, except for general lines, have been considerably revamped. Wheelbase of the 127½-in. Standard Eight has been increased to 129¼. A number of changes have been made in the engine and chassis to increase reliability; quietness is further enhanced, and cars have been engineered for radio installation. Handling ease has been improved with new steering gears on all cars, and larger clutches on the eights.

Performance has been left untouched, except for the added weight occasioned by the wheelbase increases. Prices, not available at the time of writing, are expected to be materially higher.

Changes affecting the appearance include new fenders front and rear. Front fenders are carried forward and down farther, and both sets have gutters under their edges to carry water away. Dual horns, which now are standard on the Packard eight, are recessed slightly in the front fenders for more hood clearance. Rear fenders follow more closely the wheel lines. On the left rear fender the tail light bracket and gas tank filler have been combined, there being a flexible connection to the tank from this point.

Fender lights are now standard on all cars. Windsplits have been added to louvre doors in the hood. Running boards carry double chrome molding trim. Radii at window corners are larger.

Inside the cars there are new garnish moldings, one such molding being on top of front seat back, and dome and corner light brackets. Steering wheels are colored to match the molding trim on all cars. Interior cowl sides are now carpeted and have chrome screens for the side ventilators.

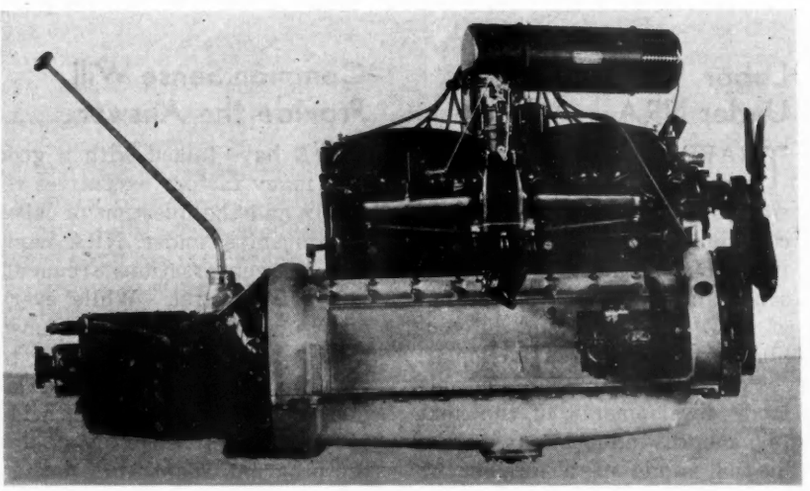
Instrument panels have been modified and rearranged to provide for the inclusion of a removable radio panel at the top center of the panel. All cars now carry ash trays in the header bar of the cowl. Packard has reverted from the plain-trim to the wide-pleat type of upholstery. Rear center arm rests are wider. Side arm rests carry cigar lighters on both sides in all cars.

Rear and rear-quarter curtains are of the concealed type. Front-seat backs have been formed to offer more rear-compartment leg room. Front seats, furthermore, are higher than formerly and carry softer cushion springs at the top than further down. Seat adjustment has been made easier.

Rear-window ventilators have been dropped and swinging-crank ventilators are now provided in the front compartment, with a solid bar separating the swinging and sliding halves.

Further "appearance" changes include wider bumpers front and rear, and new trunks on the close-coupled models. The eights now carry full-length rear bumpers.

Changes affecting reliability include such items as Spicer universal joints with cageless roller bearings on all cars; Harrison oil-



Right side view of Packard eight engine showing air-cooled generator, removable hot-spot in manifolding

SLINE FOR 1934

Packard Series 1101, five-passenger sedan. Fender lights, fenders, dual horns, front ventilating windows, etc., are new

Rear view of a Packard Super Eight Club Sedan showing new trunks, combination tail lights and gas tank filler bracket and new bumpers

Features of New Packards

Prices are from $200 to $330 higher. The complete schedule appears on Page 317.

Wheelbase 127½-in. standard eight increased to 129¼. 141¼ and 146⅞-in. wheelbase chassis added respectively to standard and super eight series.

Appearance and body interior refinements.

Spicer roller bearing universals.

Harrison oil temperature regulators.

100% oil filters.

Large size, 12-in., Long clutch now used on standard eight.

Steel-backed babbitt lined camshaft bearings.

Cam contours modified to eliminate valve chatter.

Ventilated generator.

Horns operated through relays.

Gemmer-Marles steering gears.

New piston ring equipment.

temperature regulators on the eights, in series with a 100 per cent oil filter, and on the pressure side of the pump; pumps of larger capacity, larger oil lines on all cars, and direct pressure lubrication of the clutch throwout bearing through a flexible connection inside the clutch housing, from the Bijur system.

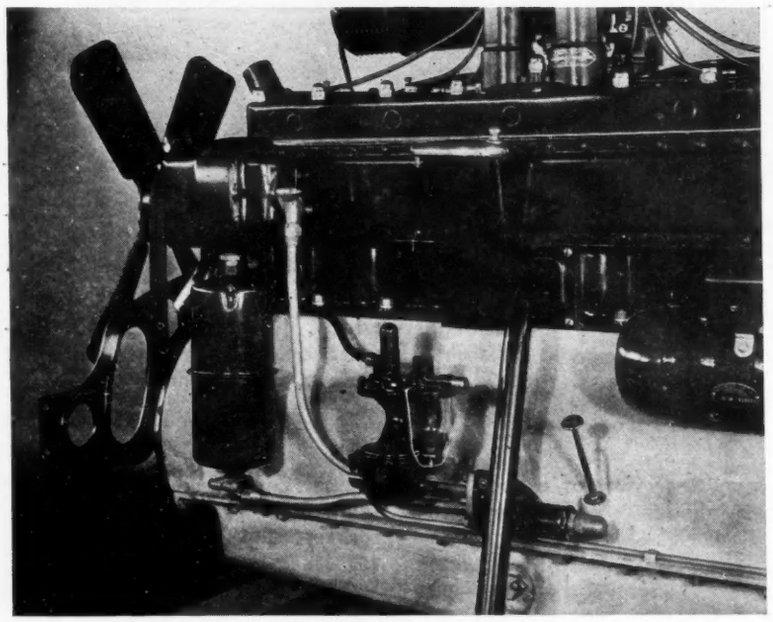
The Packard 8 now carries the large size (12-in.) Long clutch, the adoption of which has reduced the pedal pressure required from 35 to 23 lb., and also increased the life of the linings. Eight-cylinder camshafts are carried in steel-backed, babbitt-lined bearings. Cam contours have been modified and now are of non-symmetrical shape, to eliminate valve chatter. Generators (of Dyneto make) now have more effective cooling, being provided with a screened-horn type of air intake and a suction outlet.

On the 12, the generator has a three-point mounting. Detail changes have been made in the water distribution system of the eights. Horns are now operated through relays, to prevent corrosion at the horn button.

To facilitate service operations, the hot spot in the manifold has been made removable, and batteries are so arranged that they can be removed through the seat frame. Formerly they had to be removed from below the car.

(Right) Section through a Packard 8 muffler showing the resonator chambers. The lip or flange on the through pipe deflects gases into a circular path in these chambers

(Below) Oil coolers are now standard equipment on the Packard Eights, shown here located above the 100 per cent oil filter



Gemmer-Marles type steering gears have been adopted on all models. Gas tank capacity has been increased to 25 gal. on the eight, and 32 on the twelve. The 1100, the eight of shortest wheelbase, now has 60½ in. rear springs, as against 56 in. formerly, for better riding. A reverse-operated switch is provided for the stop lights, for backing purposes at night.

With the object of enhancing the quietness of the cars, new intake silencers of a three-chamber type have been adopted, and new mufflers, which are of the resonator type on the twelve, and a combination resonator and absorption type on the eights. Flexible couplings are provided between the mufflers and the powerplant, to prevent transmission of noise and vibration. All tail pipes are tuned for minimum exhaust noise.

To lower the oil consumption, the piston ring equipment has been changed and now consists of one straight compression ring at the top, two Perfect Circle 70's next, and a Perfect Circle 82 below. The "70's" are step-cut rings.

In the twelve the coil has been relocated on the cylinder block, instead of on the dash, to shorten the high-tension leads, with the particular object of eliminating radio interference. Other provisions for better radio reception include the sheathing and grounding of lead-in wires from the roof antenna.

There are a total of 41 bodies in 13 types in the 1934 Packard line. Wheelbases are as follows:

Twelve-cylinder wheelbases are unchanged.

PACKARD EIGHT

Model 1100..129¼	(1001 was 127½ in.)
Model 1101..136¼	(1002 was 136 in.)
Model 1102..141¼	This new chassis is for 7-pass. Sedans, etc.

PACKARD SUPER EIGHT

Model 1103..134⅞	(unchanged from 1003)
Model 1104..141⅞	(unchanged from 1004)
Model 1105..146⅞	new chassis for 7-pass. Sedans, etc.

Modern Travel on the Desert

The desert caravan coach which is being constructed by Marmon-Herrington for use in transporting passengers across the Syrian desert. The vehicle, which is more than 66 feet long, is powered with a Hercules Diesel engine. The body is a product of the Bender Body Company of Cleveland and has comfortable seats for 31 passengers. The truck-tractor is a Marmon-Herrington Model 315-6—six-wheel-drive

Correcting Diesel Engine Output for Atmospheric Factors

CORRECTION factors which must be applied to the results obtained in engine tests to take account of variations from standard atmospheric conditions, have been pretty well worked out and standardized for the case of Otto-cycle engines, but it appears that nothing along this line had been undertaken for the case of Diesel engines until recently. Research work to determine the effects of moisture content of the atmosphere, atmospheric pressure, and atmospheric temperature on the output of Diesel engines has been carried out at Pennsylvania State College, and the results were given in a paper on Reducing the Performance of a Solid-Injection Diesel Engine to Standard Conditions, presented by H. A. Everett, head of the department of mechanical engineering of that institution. All tests were carried out with a Hill four-cylinder, four-cycle, solid-injection engine of 5 by 7 in. bore and stroke.

Professor Everett found that variations in the humidity of the air drawn into the engine have no appreciable influence on its power output. In an Otto engine the power output decreases substantially in the same proportion as the oxygen content of the charge is reduced by the presence of water vapor. This this does not hold in the case of a Diesel is probably due to the fact that in the latter there is always a considerable proportion of excess air, and combustion therefore is not materially influenced by the presence of the moisture.

Since humidity has no appreciable effect on the output, evidently the only factor affecting it is a change in atmospheric density. Such changes have a direct effect on the air/fuel ratio of the cylinder charge, and the Diesel cycle is very sensitive to variations in this ratio. Results of test runs therefore were plotted on a base of air/fuel ratio.

One of the objects of the investigation was to get the answer to such questions as the following: "With the engine in normal operation under sea-level conditions, what would be the effect on its output if it were suddenly transferred to an altitude of 10,000 ft.?" The speed of rotation evidently would remain unchanged, as that is controlled by the governor. The fuel injected per stroke also would remain the same, but the horse power developed would decrease, owing to the decrease in thermal efficiency resulting from the decrease of the air/fuel ratio, which in turn is the result of the decrease in the atmospheric density.

Fig. 1 which shows the variation of the indicated horse power of the test engine at 800 r.p.m. with the air/fuel ratio and the inlet pressure, was plotted from actual test results. In this chart only the pressure of the inlet air and not its temperature is given. By taking account of the inlet-air temperature, the density of the inlet air may be arrived at, and in Fig. 2 are shown constant-indicated-horse-

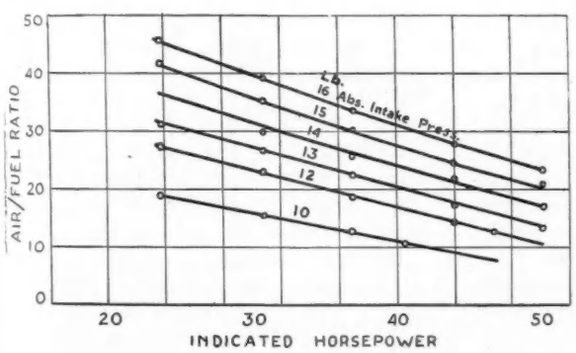
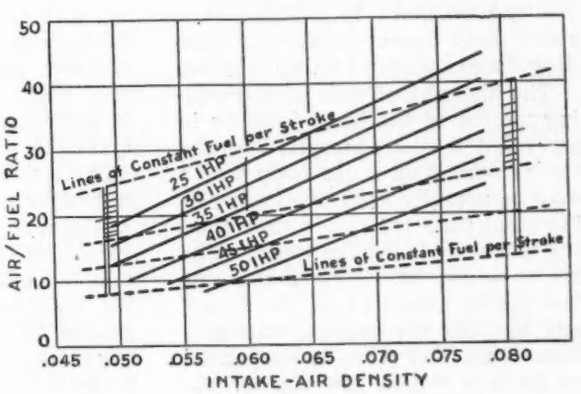


Fig. 1—Graph showing how indicated horse power of engine increases with pressure of intake air and decreases as the air/fuel ratio increases

Fig. 2—Graph for determining the change in engine power with a change in intake-air density.



power lines on a coordinate diagram whose coordinate scales represent intake-air density and air/fuel ratio respectively. Naturally, the indicated horse power increases with the inlet-air density and increases as the air/fuel ratio decreases, hence for constant horsepower an increase in air density corresponds to an increase in air/fuel ratio. In Fig. 2 are also drawn in a number of dashed lines representing constant amount of fuel per stroke. These are merely inclined lines passing through the common zero point of the horizontal and vertical scales. These lines must be followed in determining how the air/fuel ratio varies when the intake air density varies. Suppose, for instance, that an engine is developing 25 hp. with an intake-air density of 0.065 lb. per cu. ft., and it is desired to know what the horsepower will be if the air density is increased to 0.075 lb. We start on the horizontal scale at the point representing an air density of 0.065 and pass up the vertical line to the point of intersection with the inclined line representing 25 hp. From there we pass along the inclined line representing constant fuel per stroke which passes through this point, to the right until intersecting the vertical for a density of 0.075. The point of intersection of the two lines is on the inclined line representing 30 i. hp., hence that is the power the engine will develop at the higher intake-air density.

Similarly, suppose it were desired to compare the performance of this engine when operating under sea-level conditions with its performance at an altitude of 12,000 ft. From the N.A.C.A. chart for the standard atmosphere we find that the air density at sea level is 0.076 lb. per cu. ft. and at 12,000 ft. altitude, 0.053 lb. per cu. ft. If at sea level the engine developed 45 i. hp., then, by proceeding on the chart as in the foregoing example, we find the engine in the rarer atmosphere will develop 30 i. hp.

The Forum

Height of Center of Gravity and Skidding

Editor AUTOMOTIVE INDUSTRIES:

I have given considerable thought to the article of P. M. Heldt published in AUTOMOTIVE INDUSTRIES of Aug. 12, 1933, relative to the effect of the location of the center of gravity of a car. Mr. Heldt's analysis is made on the basis that he is dealing with a rigid body, whereas in reality we are dealing with a highly elastic body. His analysis indicates that there is no effect on the skidding tendencies regardless of the height of the center of gravity. The final effect on this elastic body is debatable, but I think in practice a high center of gravity results in a rolling motion of the car body on turns, to such an extent that the driver is disturbed and slows down before he reaches the skidding conditions. This is true with a high center of gravity. With an extremely low center of gravity he does not notice the tendency to roll and as a result may reach dangerous skidding speeds without being warned.

The thought of this elastic rolling motion of the body develops in my mind a new conception of the forces acting on a car body which may be usefully used to obtain riding conditions that are better than we have had in the past. The major weight of the car is more or less rigidly mounted on the frame and includes the engine, transmission, body, etc. This is suspended on springs which are elastic, the springs and axles in turn being suspended on elastic tires. I think we can draw an analogy between this condition and that of a boat, the elastic suspension of the springs and tires taking the place of the buoyancy of the water. In a boat the time for an oscillation when the boat has been forced out of its natural position is equal to 3.14 times the square root, of the radius of gyration r squared, divided by the distance from the center of gravity to the meta-center m times G. I believe that in a car we have a meta-center exactly the same as in a boat, except that its position shifts because of the variable nature of the spring forces. For small movements it does not, however, shift to any great degree. In a boat the stability increases with the weight and with an increase in m and a decrease in r. However, these values, especially m, cannot be made extremely large, because this will result in an extremely fast oscillation, which is not only uncomfortable to passengers but tends to shift cargo and cause damage, because the boat will not give easily when hammered by waves.

Turning to car design, I think we have exactly the same thing, and as we lower the center of gravity we greatly increase m, which results in very short rapid pitching motions that are not evident with a higher center of gravity and result in extremely uncomfortable riding conditions. To slow up the oscillating rate we should put the heavy masses as far as possible from the center of gravity, increasing r, and should raise the center of gravity to the point where m has a proper positive value, without making it so short that it will result in an unstable body. I have not calculated the forces acting under these elastic conditions but I think, that when rounding a curve, if the curve is not too long, much of the centrifugal force will be absorbed in rolling the body, instead of being translated into tipping and skidding, provided the center of gravity is high enough to give a slow period of oscillation. We know that springs with a high static deflection generally result in easier riding, and I think this perhaps is because these springs do not build up as rapidly and therefore maintain the meta-center nearer the same point and allow a soft roll instead of a sharp pitch, provided the center of gravity is high enough to be effective in this way.

Modern hard-surfaced roads have a tendency to produce parallel waves like small bumps such as the expansion joints in concrete, which act on both front wheels or both rear wheels at the same instant. This in many cars produces a very sharp pitch which is extremely disagreeable. It can be dampened to a great degree by proper shock absorbers, but I wonder if it could not be greatly helped by a study along the above lines and perhaps by making the center of gravity somewhat higher than it has been in most recent cars.

J. E. PADGETT.

The N. R. A. and Trends

by C. A. Musselman

President, Chilton Co.

C. A. Musselman

FOR years idealistic business men have wanted to police their competitors. Now that the N. R. A. offers the opportunity, this regulation is resented by many. Maybe this is because it is difficult to see ourselves as others see us.

THE two outstanding activities of the administrators of the N. R. A. deal with hours and wages. While there is much difference of opinion among employers, it is universally acknowledged that the general trend is toward a reduction in hours of labor and an increase in wages. The force is as irresistible as the onrushing of flood waters, and since the change is inevitable, it is desirable to solve rather than fight this problem.

IN a discussion of the number of working hours for the average industry, it is evident that labor—and possibly official Washington—favors 35, while industry in general prefers 40 hours per week. The forces at work against industry seem to have sufficient strength to eventually accomplish their purpose in obtaining the 35-hour week.

If this will lessen the fluctuation in employment, it will make business depressions of the future less severe and keep buying power at a higher level. If the shorter week has this beneficial effect, will it not be wise for industry to assist in reaching the goal by an orderly but sure march?

IF hours of labor could be reduced every time production is increased as a result of the invention of labor-saving machines, benefits would be distributed to maker, user and laborer and thus buying power could be maintained. If labor-saving machinery does not benefit every member of this triumvirate, it loses its full importance in the economic order of things.

The intelligence and the inventive genius of Americans who have produced and used our marvelous labor-saving machinery which has resulted in a speeding up of production and the lowering of manufacturing costs should have realized that those advantages which benefit but two of the three factors essential to permanent success could not be lasting; and therefore it should have been their duty to have developed the thought that there should have been reduction in hours of labor without reduction in wages, to compensate for the share which labor lost while machinery gained. The benefits obtained from the labor-saving devices in the past decade were sufficient to justify their being shared by each of the triumvirate.

ANY big movement divides men into two camps—for and against. That is why you occasionally hear complaints directed at the N. R. A. If malcontents would but remember that the good of many is the good of all, their vision would be expanded sufficiently for them to become enthusiastic, if for no other reason than personal benefits.

PSYCHOLOGICAL reasons—mind over matter—or, in just plain English—what we think, is behind all mass action.

What most people think today is that the N. R. A. is going to pull business up by its boot-straps, and many impatient men and women haven't been able to wait for proof but have already started to spend and consequently business is better. If it has already got started before starting time, just imagine where it is going when it gets going.

Smaller Headlamps for S

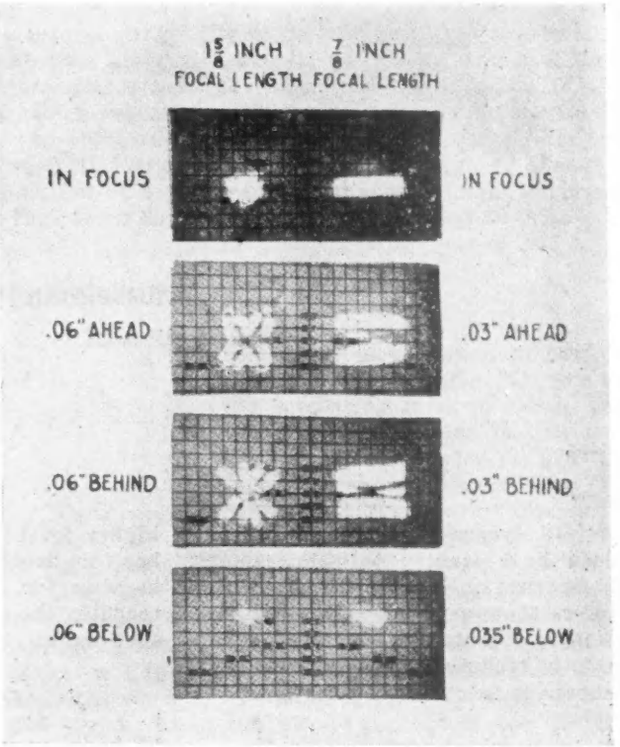
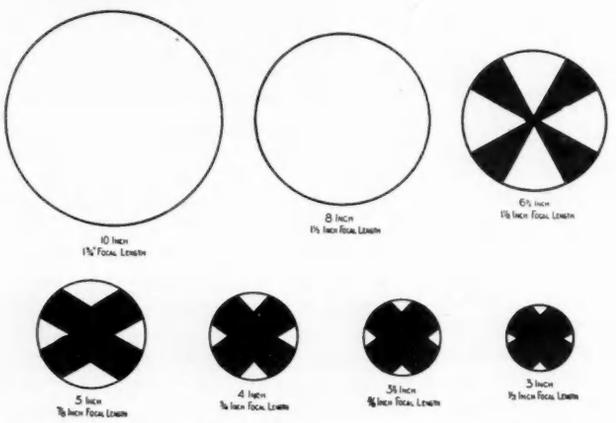


Fig. 9 (Right)—A photographic analysis of permissible tolerances in source positioning

Images are formed from critical parts of those reflector zones that provide the high-intensity (top) portions of the beam. The displacement of these images as the source is moved from design position is compared for reflectors of different dimensions. Above, a 5-inch reflector of ⅞ in. focal length is compared with a commonly employed reflector of 1⅝ in. focal length. For the same vertical displacement of images, closer tolerances must be met with the smaller unit.

Fig. 8 (Below)—Reflector zones available for producing the high-intensity portion of the beam of a multi-unit system with a single line source in the form of a helically coiled filament in each unit

The white portions represent the areas which meet the limitation of a maximum vertical divergence of the rays of 2 deg.



THE feasibility of headlamps of smaller size in a multi-unit system follows from the fact that when but one beam is to be provided from a unit, it is no longer necessary to use only the side sections of the reflector to form the high-intensity portion at the top of the beam. Upper or lower zones are also available, as shown in Fig. 8. The extent of these additional areas is conditioned by two factors: first, the vertical projection of the source toward these areas, and second, the tolerances needed as to source positioning.

An approximation of a line source lying horizontally through the focus at right angles to the reflector axis has the minimum vertical projection to the greatest area of reflector. There are, however, limits to the length of such a coil since the vertical projection increases with distance from the focus. The problem, therefore, becomes one of finding the most favorable relation between coil diameter and length, and insuring that the result is consistent also with the requirements of efficiency of light production. The question naturally arises whether there might be an advantage in a somewhat flattened coil. But this increases the projected dimension in one direction as much as it decreases it in another. Furthermore, the candlepower is thereby reduced in the direction of the smallest images, from which high candlepower is most desired.

A favorable source form for a 32-cp lamp in a reflector of 5-in. diameter and ⅞-in. focal length, for example, is found to be a horizontal helix of 0.03-in. diameter and 0.14-in. length. A unit of this size produces a high-intensity zone of the required dimensions, 2 degrees by 6 degrees, with a high point from one headlamp of 20,000 candlepower, a value below which it is not desirable to go. It thus represents about the smallest size that can be employed for the type of beam pattern indicated in Fig. 1 and an acceptable percentage of intercepted light.

There remains, then, the question of what limits in source position will permit fixed-focus construction of these small units. For this determination a photographic analysis is convenient. In Fig. 9 there are recorded the positions on the screen of the images of the filament for various positions of the source in relation to the focus. The images recorded are from those points in the zones of the reflector used

Streamlined Cars

Part 2 of a study of the technical problems involved in the development of headlamps. Part 1 appeared in the issue of September 2 of Automotive Industries on page 270

by W. C. Brown and V. J. Roper*

for the high-intensity part of the beam which are most sensitive to the position of the source. It will be observed that the permissible tolerance for a reflector of 7/8-in. focal length is only half that acceptable for a 1 5/8-in. unit. In fact, the authors' experience with the small units leads them to suggest that the tolerance in positioning of light source be limited to 0.025 in.

This order of accuracy is not attainable with past practice in lamp basing, sockets, and their assembly in the reflector. It does, however, become feasible with a lamp having a prefocused base which is seated at three points related definitely to the reflector. Such bases and holding arrangement have been developed and small units giving well-controlled results are now practicable.

A multi-unit system of headlamps would ordinarily comprise four units, each with a different light distribution. The main driving beam for the open road, the meeting beam, and the lower beam for city use would each be formed from two units, or in some instances from three. The main driving beam and the meeting beam illustrated in Figs. 10 and 11 were produced by 5-in. units with paraboloidal reflectors of 7/8-in. focal length. One of the lenses employed is shown in Fig. 12. Since only two units are used to produce the main driving beam, the limitations as to vertical concentration do not apply with equal force to the other two units, and one or both of them might therefore be made of even smaller diameter if desired.

It is obvious that when state regulations with reference to intensities above the horizontal are modified for the main driving beam, the limitation of a 2-deg. depth for the filament images in the high-intensity part of the beam no longer applies. To the extent that more

A Paper presented before the Twenty-seventh Annual Convention of the Illuminating Engineering Society, Lake Delavan, Wisconsin, Aug. 28-31, 1933.

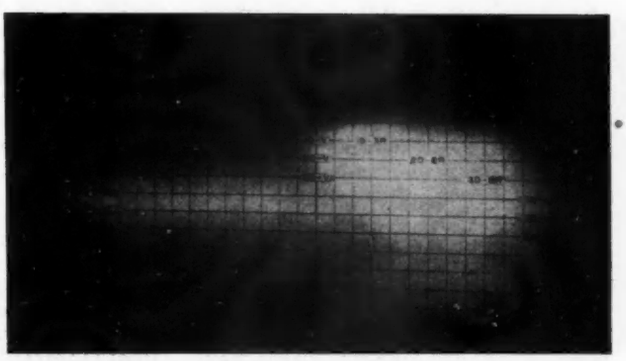
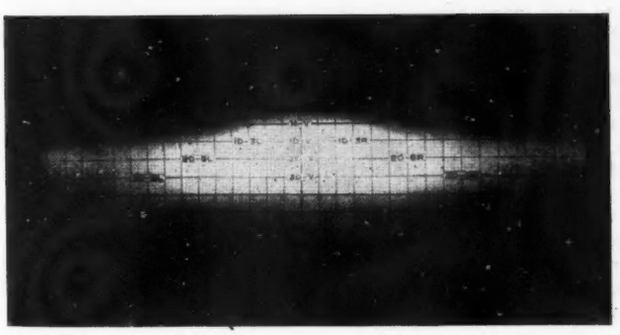


Fig. 11 (Above)—Pattern of an asymmetric meeting beam produced by 5-inch paraboloidal reflectors and lenses as shown in Fig. 12

Fig. 10 (Below)—Pattern of a driving beam, conforming to present-day aiming restrictions, produced with line sources, 5-inch paraboloidal reflectors and lenses of the general type of that shown in Fig. 12



* Nela Park Engineering Department, General Electric Company, Cleveland, Ohio.

light is directed above the horizontal, some reduction in the limiting diameter and focal length of the headlight units becomes feasible, for the critical part of the beam, from the standpoint of fixed-focus characteristics, is this high-intensity section, so far as the multi-unit system is concerned. Since, however, effective utilization demands that the beam pattern and maximum candlepower be well maintained, no further reduction of considerable magnitude can be safely applied without, also, some reduction in tolerance in the placing of the source. In the multi-filament system there is the further complication of maintaining the differential in direction between or among the beams, and hence the reduction in size possible when additional light is permitted above the horizontal is less marked.

As the units become smaller, their brightness increases, since the candlepower must be maintained at the same values as those obtained from large headlamps. Higher brightness means additional glare. However, in motoring, the headlights appear with maximum contrast against a black background, and in any event they subtend but a small angle at the eye of the approaching motorist. Therefore glare is determined almost entirely by candlepower. Within the range of conditions here discussed, the difference in either interference with vision or discomfort is not especially marked as between the large and small units.

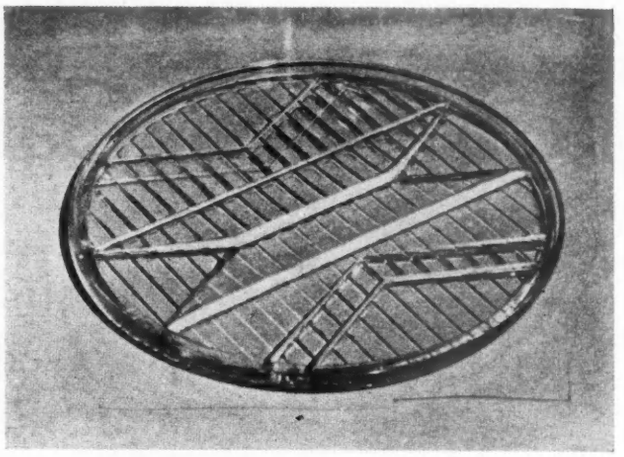


Fig. 12—An experimental lens for a multi-unit system—designed for a 5-inch paraboloidal reflector of 7/8 in. focal length. The lenses for the several units differ somewhat from one another

The limiting factors in headlamp design are, then, character of beam pattern, the requirement of fixed focus, the maintenance of a differential in beam elevations in a multi-filament system, efficiency of light utilization, size of source, form of source, and the tolerance in source positioning with reference to the reflector, which is dependent upon the principles employed in the basing and holding of the sources in the units.

The effect of these limitations is a minimum size for multi-filament units materially greater than that for headlamps of a multi-unit system. With a multiplicity of units, the illuminating engineer has greater latitude. It is no longer necessary to make compromises in each of a number of beams because they are all produced by the same reflector and lens. Instead, he can construct each reflector and lens to produce exactly the pattern desired for the given beam. The small dimensions possible in a multi-unit system give the car designer a freedom he has never before enjoyed and permit him to realize the ideal lines for which he has been striving. Units sufficiently small may be used in greater numbers and still be so disposed as to merge into the new contours of the car. It is interesting to speculate on the effect that developments in headlamps on the design of cars in the future.

Soil Concrete as a Road Building Material

ACCORDING to Ray A. Giddings, secretary of the Calcium Chloride Association, Detroit, one of the most promising developments in highway engineering is in low-cost roads involving stabilization of road-bed materials. It is well known that a gravelled road is both firm and compact when it is wet, while, on the other hand, a clay road is stable when it is dry. A good road must be stable, whether it is wet or dry, and it is in the control of these characteristics by balanced composition of local soils that new possibilities for the development of low-cost, high-type roads may be found.

In considering stability, we are primarily concerned with two factors. The first of these, internal friction—the resistance of the mass to lateral flow—is furnished by the finer sands and silt. The second, cohesion—the stickiness or resistance of the particles to being pulled apart—is furnished by the fine soil particles which make up the clays and the finer colloidal matter.

Experimental projects in surface stabilization of traffic-bound roads are said to be under way by highway authorities throughout the country. These revolve around a material known as soil concrete, which has a texture composed of a network of tiny pores which take up capillary moisture from the subgrade and keep it uniformly damp and compact. The exceptional stability of the beach at Daytona is due to the moisture film that adheres to each grain of sand as the water recedes and gives the effect of tightly pressing the particles together. A similar effect is obtained with soil mortar.

Unfortunately, the capillary pores are inadequate to supply the soil moisture necessary for this cohesive film as fast as wind and sun will carry it off. But by the use of calcium chloride, which has great affinity for water, the moisture ratio can be built up and maintained.

Calcium chloride, when supplied to a stable road surface, performs two important functions. It acts as a primer to attract moisture to fill the capillary pores, and it also prevents the soil moisture from dissipating into the air. A stable soil mat thus produced must not be scraped or bladed, except when it is wet after a rain. Scraping of a road so treated would cut off the surface moisture film and permit the soil pores to bleed out. Immediately the moisture bond is lost, the soil mass disintegrates under the traffic, and the surface texture seal breaks up.

Calcium chloride has been used for many years in the surface treatment of roads, but the discoveries in soil stabilization are believed to add immeasurably to its value as a road-building material.

Grading and Mating Parts With Electrolimit Gages

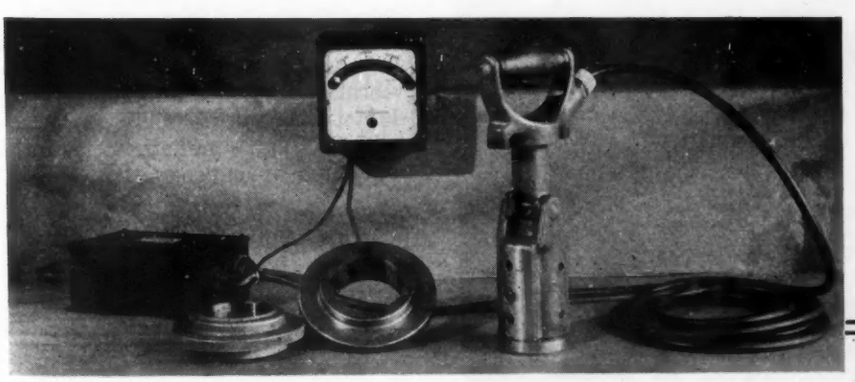
Getting Close Tolerance Assemblies With Broadened Manufacturing Limits Through Sorting of Parts Into Accurately Gaged Groups

Checking the crankshaft hole in an automotive connecting rod using the Electrolimit Gage

WHILE conventional types of gages will determine the interchangeability of parts, often they will not control the fit between these parts to the degree required to give the dependability and performance demanded of the modern engine. This has necessitated a radical narrowing of limits during the past several years. Despite the refinements in machine tool equipment, this narrowing has been carried to the point where trouble has developed in producing parts in quantity that would get past the gages. Compromises have been made in the attempt to settle the dispute between production and inspection, and to strike a balance which would be satisfactory mechanically and economically.

The recent advent of combined mechanical and electrical gaging has changed the production picture by making it possible to use the original limits, and, in some cases, ever broader manufacturing limits on the one hand, and on the other assuring accurate assembly. Added to this is a direct and substantial inspection cost reduction. These facts are the reasons why certain progressive engine builders are using the new Electrolimit Gage.

This device, as is known to the readers of *Automotive Industries*, is the result of combining the electrical ingenuity of the General Electric Co. with the gage-making experience of Pratt & Whitney Co. The device is simple, and can be arranged for either external or internal use in a wide variety of applications. It transforms the movement of a mechanical gaging contact into electrical terms, and presents its findings in a highly magnified state on an indicating instrument (micro-ammeter). Anyone can be taught to operate it efficiently in a few minutes, and can obtain fast and accurate results. The automotive industry already has found the Electrolimit Gage excellent for checking wrist pins, connecting rod bearings and cylinder bores, and its flexibility will lead to its use for inspecting many other



A typical arrangement of the Electrolimit Gage for inspecting the cylinder bores of engines. The master ring bores of engines

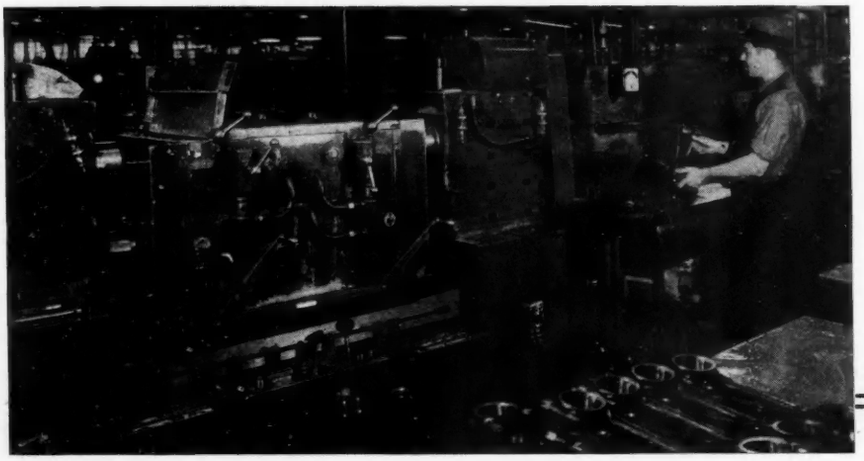
Inspecting wrist pins and pistons using the Electrolimit Gage. The wrist pin hole in the piston is checked in the same manner using a gage arranged for internal work

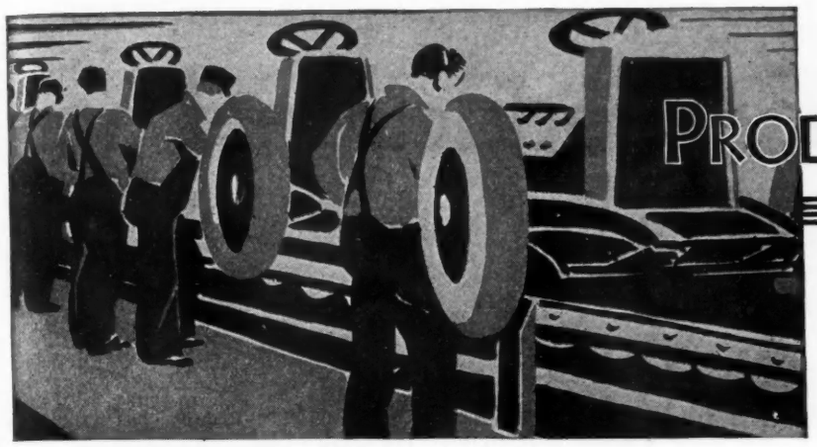
parts as well. The illustrations accompanying this article show typical applications in a well-known automobile factory.

Actually the Electrolimit Gage makes possible "accuracy within accuracy," assuring good performance. What happens is that the Electrolimit Gage grades supposedly identical parts into very accurately gaged groups, so that the parts in any one group are alike within extremely close limits. For example, wrist pins being produced between basic sizes and .0004 in. under are sorted easily and quickly by Electrolimit inspection into four groups .0001 in. apart, or even finer if desired. Correspondingly, the piston holes are produced from basic size (plus oil film clearance) to .0004 in. larger, but they also are sorted usually into four .0001 in. limit groups. In assembling these two pieces it is very simple to bring together corresponding groups which will coincide within .0001 in. if desired. All assembly trial and error and dependence on the assembler's "feel" are eliminated. The work can be done quickly with absolute assurance, and costs are reduced greatly. Most important of all, the future performance of the engine, so far as piston and wrist pin assembly is concerned, will be practically perfect. And exactly the same story is true for connecting rod fits at both ends, and the fit of pistons in cylinder bores.

The new system of gaging has many decided advantages. In the first place, Electrolimit gaging is faster. An operator can inspect wrist pins for size, roundness and straightness, and grade them by "tenths" at the rate of 750 per hour. Connecting rods and pistons can be inspected and graded at the rate of 400 holes per hour. Cylinder bores can be checked and graded in the same manner at the rate of 30 eight-cylinder blocks each hour. The Electrolimit Gage makes it possible to mate parts that will function properly together without relying on "feel." By getting such a close check on straightness, taper, roundness, surface finish, etc., the machine operator receives material assistance in maintaining his machine set-up properly without a lot of spoiled work. That is why the gage frequently is found right beside the production machine as well as in the Inspection Department. It is an excellent shop gage because vibration and the "human element" do not affect it. Finally, the Electrolimit Gage eliminates constantly replacing worn production gages.

Inspecting wrist pin holes in automotive connecting rods in a large automobile plant. The Electrolimit Gage is used at the machine to check production at the source, and minimize spoiled work





PRODUCTION LINES

Changing World

Of timely interest is a new book, "Labor Economics and Labor Problems," by Dale Yoder, as its name implies, it deals with the various aspects of the social problems presented by the worker in industry. Among other things the book deals with stabilization of employment, employers' associations (tying in with the discussion of NRA codes) and a visualization of the tendencies toward industrial democracy. Presented as a formal text on the subject, it is of vital interest not only to the student but to every one concerned with the changing pattern of personnel problems.

The book runs 630 pages, with a complete index and bibliography. Published by McGraw-Hill, at $3.50 a copy.

Cold Forged

Parker-Kalon would like to send you some samples of the new line of cold-forged thumb screws. Thumb grips are nicely shaped and with a clean finish that can be plated if desired. Heads have a grid-shaped knurl, providing a firm grip. Made in a full range of sizes.

Foiling Heat

Thousands of hours in a pickling bath of powerful acid; continual rubbing on a hard grinding wheel; bathed in the hottest known flame while completing a perfect piece of work. In the exhibit of Haynes Stellite at a Century of Progress these splendid qualities of modern alloy metals are illustrated.

A continuous comparative corrosion test between Haystellite and ordinary steel is run. Sections of these two metals are suspended in a bath of hydrochloric acid. As myriads of bubbles rise to the surface of the tank one can easily see that the acid is rapidly eating the steel, which must be replaced every day. The piece of Haystellite has been in there since the start of A Century of Progress, and according to accurate measurements of the effect of the acid to date could remain there until after the year 2000 A.D. without any greater amount of corrosion than is suffered by the steel in 12 hours.

Here It Is

Lukenweld has been awarded the contract for the manufacture, in arc welded rolled steel construction, of the complete engine structure for the 600-hp. Winton engine which will power the new 110-mile an hour light-weight passenger train of the Union Pacific System.

The engine parts to be built by welding consist of the engine frame proper, the oil pan and 12 cylinder heads. The engine will be a V-type, twin six unit, direct-coupled to a generator.

The highly-stressed engine frame proper will be constructed of a new high-strength alloy steel by a new welding technique which deposits weld metal with characteristics equal to the high strength base metal. Entire frame will be subjected to a radiographic examination as an inspection check to insure the quality of the welds.

Not First Cost

Broaches are no different than any other quality product — you only get what you pay for. When trying to determine how you should tool the job, it should be remembered that it is the cost per piece and not the initial cost that counts in the final analysis.

By buying a broach that has quality workmanship and the latest engineering design, the life between grinds is materially increased as well as the useful life of the broach. Down-time on expensive machinery, caused by tool changes, is lost money. This same down-time sometimes represents difference between profit and loss. —From *Tool Tips,* July-August, 1933.

Five Minutes

Time-saver for motorists and service stations is offered by the Sharpsville Boiler Works Company, Sharpsville, Pa. The "Sharpsville Five-Minute Oil Changer" is designed to simplify the routine of changing automobile motor oil. Electrically-driven pumps suck the oil from the crankcase through the dip-stick hole into a glass tank where the car owner can see for himself the condition of the oil. If it should be changed, the attendant merely throws a switch and the oil changer flushes the crankcase. If the oil is in good condition a reversible pump forces it back into the engine. The procedure does not take over five minutes.—J. G.

MANUFACTURING MANAGEMENT METALLURGY

S. A. E. Production Papers

THAT a new deal for production executives is in the cards became evident from the discussion which followed the presentation of Production Activity paper on Monday at the session presided by F. E. Moscovics. In the opinion of those present the time has come for the production department to become articulate in the accounting policy of the concern since the equipment policy, depreciation accounting, establishment of overhead and the other related factory management problems vitally affect the welfare of the entire organization.

The relationship of the factory management to the executive branch of the business was definitely established in the paper, "Executive-Factory Liaison Clears Moot Points in Equipment Buying," presented by Joseph Geschelin, engineering editor, Automotive Industries. The most important function of this paper was to show the need for closer cooperation between the executive and factory heads if the best interests of the company are to be served.

J. E. Padgett questioned the possibility of maintaining an earmarked replacement fund on the ground that this would tie up much liquid cash. This was countered by point that the fund need not be large relative to the general cash fund since machinery replacements are made at regular intervals and there is seldom occasion to replace any great proportion of the company's assets at any given time. Mr. Moscovics then noted that even if the fund were large, it offered no obstacle to the liquid cash position of the company since the trust fund could still serve as a credit medium.

Mr. Padgett brought up an issue which necessitated much cloak room debate. He argued that in calculating the savings resulting from the replacement of existing equipment by new machinery, it is incorrect to include overhead in the costs per piece. In his opinion, the only basis for comparison is the saving in direct labor.

The author was upheld in his recommendation for an earmarked cash replacement fund in a discussion submitted by W. H. Rastall, chief, machinery and agricultural implements division, Dept. of Commerce. Mr. Rastall finds the paper to be particularly timely in its plea for more active cooperation between the factory and executives because of the present trends in our political economy. He feels that we are entering an era where competition will be upon a different basis, that with a better stabilization of prices, efficiency and modern equipment will be more essential than ever before.

Clinton Brettell, R. H. Macy transportation expert, pointed out how the type of cooperation urged by the speaker has resulted in a new order of economy in the operation of his company's truck fleet.

Those present voiced the hope that the paper would serve as the medium for bringing about the meeting of minds on this vital question. Only when the general accounting policy of the company definitely takes into account the needs and problems of the factory will the best interests of the organization be served. It was agreed in subsequent discussion that factory executives not only would bring the subject to the attention of the powers that be, but that the Production Activity would endeavor to make it the theme for future production meetings.

Among those participating in discussion on the floor were, F. W. Cederleaf, v.p. Production Activity, I. W. Spring, R. S. Drummond, and Max Skvolsky.

V. Rumely was holding the chair during the hot discussion at the production meeting on Tuesday when the boys cut loose on the problems of silent gearing and the official advent of external broaching.

In discussing the paper by Fred W. Cederleaf, the concensus was that the production department was up against a tough proposition when it came to the question, "When Quieter Gears

New Formula Shows Effect of Altitude on Engine Power

R. F. Gagg and E. V. Farrar in their S.A.E. Congress paper "Altitude Performance of Aircraft Engines Equipped with Gear-Driven Superchargers" develop a new formula for the variation of engine horse power with altitude, as follows:

$$Hp = Hp_o\left[\frac{\frac{P}{P_o} - \left(1 - \frac{P}{P_o}\right)}{7.55}\right]$$

where P is the atmospheric density at altitude A;

P_o atmospheric density at sea level;

Hp, the brake horse power at any altitude A

Hp_o, the brake horse power at sea level.

A curve plotted from this equation shows that the horse power decreases 10 per cent at 3000 ft. above sea level; 20 per cent at 6350 ft.; 30 per cent at 10,000 ft.; 40 per cent at 14,000 ft.; 50 per cent at 18,300 ft., and 53 per cent at 20,000 ft.

The paper describes a comparatively simple method of determining the altitude performance of conventional aircraft engines in the range from sea level to 20,000 ft., without the use of an altitude laboratory.

The variation of brake horse power with altitude is a straight line relation when plotted against atmospheric density ratio $\frac{P}{P_o}$ and falls to 47 per cent of the sea level value at 20,000 ft.

The variation of manifold pressure with altitude is a straight line relation when plotted against atmospheric density ratio $\frac{P}{P_o}$ and falls to approximately 47 per cent sea level value at 20,000 ft.

A manifold pressure curve with reduced carburetor air inlet pressure and sea level exhaust may be run and extrapolated to sea level density to obtain a hypothetical full-throttle sea level manifold pressure.

The brake horse power at sea level with the above hypothetical manifold pressure may be obtained from an extrapolation of the curve of brake horse power at sea level versus manifold pressure, and the brake horse power at any altitude determined from the equation presented.

rs Start Lively Debates

Are Demanded How Will We Make Them?" Practically everyone agreed that we had about reached the limit of our resources in the matter of building gears to fine tolerances. A suggestion was made by Tanner of Pratt & Whitney and P. L. Tenney of Olds that engineers should develop their transmission design around the best possible production gears now available.

R. S. Drummond brought out the point that overall accuracy of a gear is more important than individual tooth accuracy. J. E. Padgett followed along the same line and suggested further that the real answer is to design more rigidity into the gear case and do something about mounting it so as to eliminate the transmission of vibrations.

Several discussors including White of Warner Gear Co., emphasized the role of acoustics in transmission design. The latter also put it up to the steel makers to produce gear steels and forgings which would be more uniform in structure and less affected by heat changes.

Joseph Geschelin drew attention to the studies on acoustics which were published in Automotive Industries last year, in which it was demonstrated that the quietness of an individual transmission unit was no criterion of its behavior when mounted in the vehicle. Thus all the heart breaking work in the production department could be nulified if certain noises in the normally inaudible range were to be reenforced by some part of the vehicle and become annoying through the effect of resonance.

In the second paper by C. E. Bleicher, "External or Surface Broaching," it was evident that external broaching is fast becoming one of the outstanding metal cutting processes for high production. Discussion by J. E. Padgett, I. W. Spring and others indicated that some of the most prominent men in the factory group feel that the process is bound to go places. Although the discussion centered about the orthodox applications of the method, Mr. Spring mentioned that he is using external broaching to supplant milling wherever possible. Another speaker said that his company was broaching sprocket teeth much more economically than with the methods current these many years.

One of the most interesting applications of external broaching was the method employed by Fred Cederleaf in which the broach was used as a device for measuring machinability. It was used in connection with his study of sound gear forgings and the clue to the fact that some forgings were porous or at least less dense in structure, came when the broaching test indicated a difference in machinability of ostensibly similar forgings.

Much activity is expected in applications of the process to production jobs and the Production Activity will watch the situation with more than passing interest.

It was indicated by Mr. Bleicher that a new machine for finishing the top and side of cylinder blocks is on the fire and should be ready for the line within a short time. This machine will replace a number of milling machines which have been standard on such operations for many years.

Fleet Owners Want Smaller Automobiles

That the increase in size and luxury of popular-priced passenger cars in recent years has not been entirely to the satisfaction of fleet operators was indicated by two papers presented at the Congress, that by J. B. Macauley of the Chrysler Corporation, of which an abstract appeared in our issue of Aug. 26, and that by L. V. Newton of the Byllesby Engineering and Management Corporation, on "Effecting Economies in Motor-Vehicle Operation." Under the heading "Purchase of New Vehicles," Mr. Newton points out that standardization in passenger cars on the part of fleet owners is standardization in name only, because the interchangeability of parts between models is slight. He then proceeds to outline the requirements of fleet owners as far as passenger-cars are concerned:

"We want as simple a vehicle as possible, free from gadgets and automatic devices that invariably increase maintenance expense.

"Within the past year, certain manufacturers have offered 'standard' models on which certain devices, chromium plating, finer upholstery and hardware, have been eliminated that were features in their deluxe line. This is a step in the right direction so far as the fleet user is concerned.

"I would like to see the manufacturers of the small, popular-priced cars go still further and develop 'standard' models of 108-in., 110-in. wheelbase, with smaller and more economical 4- or 6-cylinder engines of 140, 150 cu. in. displacement, developing a maximum of 40 h.p. The coupe or sedan should weigh not over 2000 lb., preferably less, and gear ratios and maximum engine speed should be such as would limit the maximum road speed to 55 m.p.h. Only moderate performance is required. The car should have a standard tread, conservative low air pressure tires, a body designed for commercial work that will last as long as the chassis, serviceable upholstery, durable seat cushions and shatter-proof glass.

"Shackle bolts, king pins, and universal joints should be so designed and built of such materials as to give long life without renewals.

"More attention should be paid to adequate lubrication of all chassis parts and the means of lubricating these parts should be simplified. A good air cleaner of ample size should be standard equipment.

"Every part of the car should be designed with ease of maintenance in mind.

"Some may say that such a vehicle as I have visualized would not be desired by the public. Personally, I believe that higher fuel costs and higher commodity prices are going to popularize the small economical car a lot sooner than some of you may believe.

"I believe further that a car with characteristics that I have outlined would be 'dolled up' and 'gadgeted' and offered as a deluxe model, and that such a car would be welcomed by the public."

NEW DEVELOPMENTS
Automotive Parts, Accessories and Production Tools

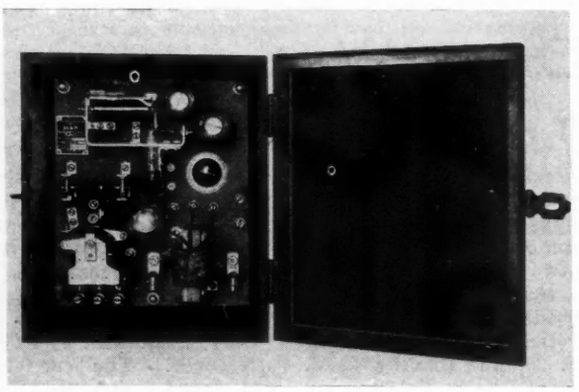
Controls the Time to Insure a Weld

One of the latest developments in resistance welding is the automatic Weld Timer, which has been announced by The Electric Controller & Mfg. Co., Cleveland, Ohio. This timer does not provide a definite amount of time for each weld, but varies the time automatically in inverse proportion to the rate of current flow to produce a 100 per cent weld at each operation.

When installed and adjusted for the desired range of work it is claimed with this new device that each weld will be perfect and all welds will be uniform regardless of fluctuations in line voltage, condition of electrodes, variations in thickness of material, amount of rust, dirt, scale, etc.

The original adjustment of the timer is easily made by welding a few scrap pieces of the work to be done, and then these welds are torn apart for inspection. When the desired weld is obtained, the cabinet door of the timer may be locked and for all practical purposes within reasonable limitations, it will not be necessary to readjust the timer; the first weld obtained being identically the same as the last one at the end of the day's run.

The standard type of automatic weld timer is shown in the attached illustration. It consists of a rectifier tube which charges a fixed condenser in proportion to the rate of current flowing in the welding circuit. When the charge reaches an amount sufficient to pass current through two neon-gas-filled tubes, a small relay is operated which in turn opens the relay controlling the main line contactor. The tubes are in the circuit only when the welding current is on, so that as soon as the main welding circuit is opened, the weld timer is ready for the next operation.



E. C. & M. Automatic Weld Timer

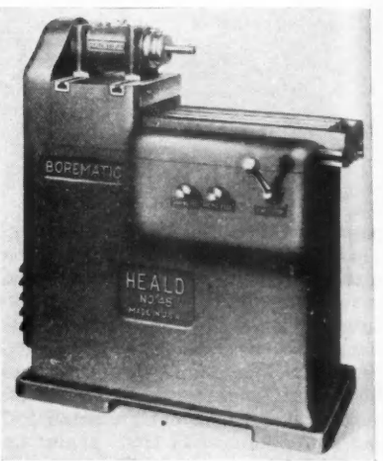
Bore-Matic for Short Runs

The Heald No. 48 Bore-Matic has been designed by The Heald Machine Co., Worcester, Mass., to meet the demand for a small machine, capable of handling a variety of work economically, yet having all the automatic features customarily associated with the "Bore-Matic."

This machine is simple and compact. It is entirely automatic in operation, requiring no manipulation by the operator except to unload, load and start the machine.

The machine is driven by a single 1800 r.p.m. motor direct-connected to a high duty hydraulic pump located low within the base. The motor and pump can easily be slid out of the base as a unit, after disconnecting two pipes.

The boring head drive is from the opposite end of the motor shaft, by multiple V belts. With the various pulleys which can be used, this motor gives a speed range to the boring heads of 625 to 3600 r.p.m. When lower speeds are desired, a 1200 r.p.m. motor can be fitted, with a hydraulic pump of larger capacity, to give a speed range of 425 to 2400 r.p.m.



Heald No. 48 Bore-Matic

Maximum and minimum centre distances between heads of the standard type when two are mounted on the bridge are 10 in. and 5 3/16 in. respectively.

The control box consists of two practically identical units which control the boring and facing feeds. They can also be used for two different boring operations. If necessary, a third unit can be added, to give a third cutting feed to the table. Boring and facing feeds are controlled by the knurled knobs which project from the front of the control box.

Goodrich Tear-Proof Inner Tube

A new type "tear-proof" inner tube designed for low-pressure balloon tires has been developed by the B. F. Goodrich Co., Akron, Ohio. Two different stocks are used in the new product, the inside periphery of the tube being manufactured to reduce abrasive action caused by rims, and the outside to resist tears even in case of flat tires.

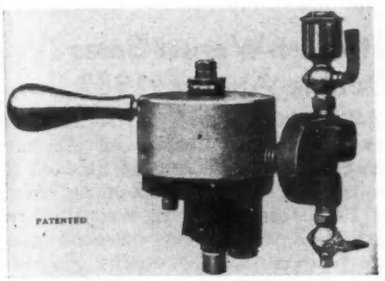
Another feature of the tube is the valve assembly, which may be inserted through the hole in the rim and the tire mounted without removing any part of the valve. The rim nut is eliminated, and in case of a flat tire the valve pulls into the rim well and prevents the unit from being torn from the tube. The tube will turn with the tire until the car is stopped.

The new tube was placed on the market Aug. 1.

NEW DEVELOPMENTS
Automotive Parts, Accessories and Production Tools

Guards Compressors From Scale and Dirt

Leak-proof air valve and oil filter attachment for double acting air compressors is being made by the Detroit Tool & Forge Co., Detroit, Mich. The Minard economy air valve is recommended by the makers where economy in air consumption is desired. The valve was developed primarily for the return of the compressed air from the exhaust side to the live side of the cylinder, and to allow only enough live air to pass through the auxiliary valve to operate attached equipment.



Air valve and oil filter attachment of Detroit Tool & Forge Co.

The filter is so designed as to prevent scale, dirt, etc., in air line from being carried into the valve or revolving connection, packing, etc., of any make of air valve or cylinder. It insures lubrication and prevents rust by mixing oil with the air in the form of a spray. This attachment was formerly made by the National Sales Engineering Corp.

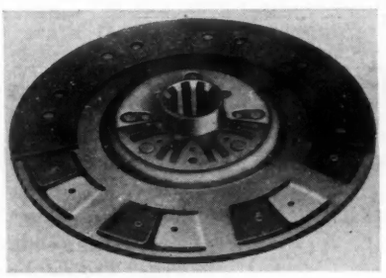
Bestolife—A Lubricant Containing Metallic Lead

A new lubricant containing metallic lead in suspension has been developed by Armite Laboratories, Los Angeles, Cal. The lead is finely pulverized and is held in suspension by a vehicle with lubricating properties. It is stated that the new product forms a thin protective film of lead on all contacting surfaces and changes such surfaces into an unbroken "antifriction" area. Instead of containing lead salts, the lubricant contains metallic lead, the lead content ranging between 15 and 65 per cent. There is said to be no tendency toward chemical reaction. The lubricant, it is claimed, will withstand temperatures up to 430 deg. F. and will not entirely lose its lubricating properties up to the melting point of lead, 590 deg.

The principal applications of the product in the automotive field are as a lubricant for rear-end gear assemblies, wheel bearings, universal joints, steering gears, and water pumps, and as a dressing for brake bands.

Ohio Flexon Clutch Disk

Ohio Flexon is the name of a new improved flexible-center, cushioned-surface clutch plate offered by the Automotive Division of the Wagner Electric Corporation, St. Louis, Mo. The hardened steel hub moves freely within predetermnied limits, in lateral and transverse directions; motor vibration, torque, and road shock are taken up by 128 flat, watch-spring-steel, laminated springs securely positioned in hardened steel plates and encased in dust-tight covers. Facings are mounted on sixteen flexible mounting surfaces alternately depressed and raised beyond the drive-plate level, to assure resiliency and resultant smoothness of action. It is claimed that the flexible surfaces will not warp, crimp or flatten out, and that they are maintained in perfect alignment with the pressure plate and flywheel.

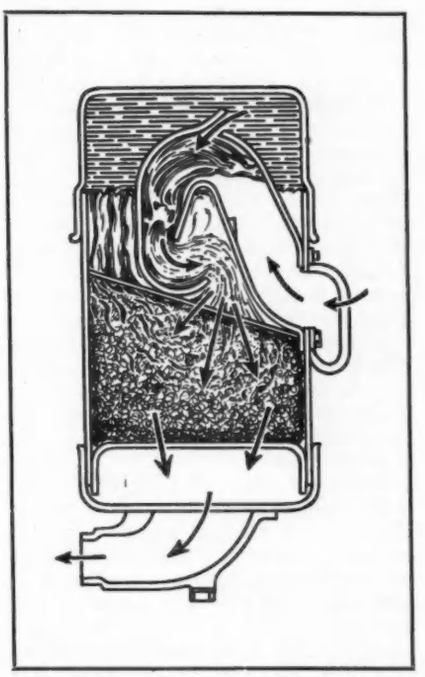


Ohio Flexon Clutch Plate

Handy Perfection Air Cleaner

A new air cleaner known as the Handy Perfection has been developed by the Handy Governor Corp., Detroit, Mich. It is of the oil wash type and is claimed to have a very high efficiency. As may be seen from the sectional view shown herewith, the air channel is completely submerged in the oil reservoir, and no air can pass into the cleaner without violently agitating the oil in the air channel. This oil is circulated as a heavy fog in the washing chamber and there removes the dust and dirt from the air. The oil in the air channel is continually replenished from the main reservoir through a slot in the lower wall of the air channel. A condenser above the washing chamber traps the dirt-laden oil and returns it to the main reservoir, where the dirt precipitates and the oil becomes available for recirculation. The reservoir holds from 2 to 4 quarts of oil and from 3 to 5 lb. of dirt.

It is claimed that the active circulation of the oil prevents clogging of the condensing element, and the latter therefore never needs cleaning. All the operator has to do is to dump the accumulated dirt about once a month. In operation, as dirt accumulates at the bottom of the reservoir, the oil level rises until it overflows, and this is a sign that the reservoir should be detached and the dirt dumped out. This cleaner is said not to reduce the power of the engine and to maintain its cleaning efficiency indefinitely.



Sectional view of Handy Perfection air cleaner

G. M. Divisions Form Company Unions; A. F. of L. Grants 15 Plant Charters

Opinion Divided as to Advisability of Taking Initiative in Formation of Company Unions—A. F. of L. Says Its Policy Is Constructive and Opposed to Agitation or Strikes Now

DETROIT—The automotive industry entered a new phase of labor relations with the announcement Sept. 2 of a company union plan by Chevrolet Motor Co. This has been followed rapidly by internal announcements of similar plans by Pontiac, Buick, Olds and General Motors Truck.

Other automotive organizations which have adopted employee representation plans include a Detroit transmission company, a wheel company in Jackson, a bearing company in Detroit and a body company in Flint and St. Louis.

Direct action in the main has not been taken by other manufacturers. Apparently they prefer to await a demand for representation on the part of employees themselves. One or two automobile manufacturers, however, have informed their employees that they will be glad to talk to committees of their own choosing under the NRA without setting up collective bargaining machinery.

While some manufacturers feel that establishment of company unions will to some extent prevent unionizing influence by outsiders, others believe that such action would arouse unrest among workers by offering union agents an opportunity for criticism.

In the meantime, the American Federation of Labor has issued some 15 charters for "company unions" under its auspices. These include AC Spark Plug, Buick, Chevrolet, Fisher Body in Flint, Olds and Reo in Lansing, Willys and Spicer in Toledo, Murray, Briggs, Bohn Aluminum, Dodge, Plymouth, Detroit Gear and Chrysler in Detroit. Preliminary meetings of employees in these plants have been held but at request of American Federation of Labor have no elected officers. Such election is next step in the A. F. of L. program during the next few weeks.

William Collins of A. F. of L., who is in charge of automotive unionization, stated to the writer that increased activity in the Detroit area was awaiting setting up of a board to administer NRA in this territory. Mr. Collins expressed himself as being opposed to any agitation or strikes at this time. He said: "We feel that our approach to the industry's labor problems must be of a constructive nature. We do not believe that the industry will ever again employ as many men as it did at one time. We recognize the difficulties inherent in the competitive situation, especially in the low-priced field, and that such corrective steps as should be taken in behalf of labor should be made in an orderly fashion."

In connection with company unions, Mr. Collins said that he had advised all workers inquiring at A. F. of L. offices in Detroit to sign up rather than run the risk of losing their jobs. No figures as to actual A. F. of L. worker enrollment in this area are available as yet; neither have they been classified according to companies.

Mr. Collins incidentally criticised Ford's policy in connection with the small industrial plants scattered through Michigan at which he alleged the rate of pay was approximately one dollar per day.—A. F. DENHAM.

Moto Meter Reports Profit

TOLEDO—Moto Meter Gauge & Equipment Corp. reports net profit of $74,745 for the quarter ended June 30 against a loss of $58,518 in the first quarter. Net profit for the first six months was $16,227.

NEW

Stewart-Warner Sales Double August, 1932

CHICAGO—For the second consecutive month sales of Stewart-Warner Corp. in August doubled the volume of the corresponding month of 1932, Joseph E. Otis, executive vice-president, announces. Second quarter reports of the company showed a loss of $155,315 compared with $691,802 in the first quarter, and the third quarter should show losses, if any, almost entirely wiped out, states Mr. Otis.

Engineering Congress Sessions Attract Greatest Attendance in S. A. E. History

Kettering Says Some Industries Are Writing Stagnation Into Codes—Hunsaker Gets Guggenheim Medal—Weaver Urges Prospecting for Facts About What Customers Want

CHICAGO—John Public may and undoubtedly does think that automotive transportation has reached a high and generally satisfactory stage of development. But there was plenty of evidence at the International Automotive Engineering Congress staged by the S.A.E., which closed here on Labor Day, that the engineers who design and build the carriers in which the public rides, think otherwise.

Sessions covering every phase of automotive engineering from research through design and production to operation attracted the greatest attendance in S.A.E. history. The papers were of a high order of quality and indicated clearly the persistent efforts the industry's engineers are making to improve automotive vehicles.

The vital necessity for continued progress in design was emphasized by C. F. Kettering as he said if future crises were to be avoided, the public's buying tendencies must be stimulated continuously with new things. He urged the desirability of flexibility in manufacturing set-up so that changes could be effected more readily and at less expense. Commenting on NRA, he said he was in sympathy with the movement, but not with the efforts of some industries to write stagnation into their codes.

Pointing out that we knew practically nothing about combustion, the phenomenon that makes the car run, Mr. Kettering revealed some of the results of the investigations conducted by General Motors Research. He said that the temperature range of from 4100 to 4400 deg. measured the difference between no detonation and detonation; that a detonating charge is opaque to ultra-violet light and that the begining of combustion lags the spark by from three to ten degrees of crankshaft travel.

The dinner on Thursday night, at which D. G. Ross was toastmaster, was featured by a table full of celebrities including Ex-Senator Hiram Bingham, Vincent Bendix and Mrs. Amy Johnson Mollison, who made a short and interesting talk. At this

(Turn to page 321 please)

WS

Wayne County August Sales Beat July 5%

DETROIT—New car registrations in Wayne County, Mich., in August totaled 6117, an increase of five per cent over July and of 144 per cent over August last year. New truck registrations were 359, almost exactly equal to July and 125 per cent ahead of last year.

Plymouth With 20-In. Wheels

DETROIT—For use where conditions demand a large road clearance, Plymouth is offering its standard models with 20-in. wheels giving a clearance of 9¾ in. Wheels regularly supplied on the Plymouth are 17.in. in diameter.

Timken Axle Statement

DETROIT—A net loss of $1,450,-062 after taxes, charges and depreciation is reported by the Timken-Detroit Axle Co. for the six months ended June 30. In the same period last year the net loss was $820,444.

September Schedules Call for 177,000 as Sales Resist Normal Seasonal Trend

Projected Production Represents Gain of 107 Per Cent Over Last Year—Early September Reports Reveal Only Slight Tapering in Demand As Yet

by Athel F. Denham
Field Editor, Automotive Industries

DETROIT — Tentative production schedules for September indicate a total for the month of approximately 177,000 units for the United States and Canada. The estimate represents an increase of 107 per cent over September last year. While this forecast indicates a drop of 22 per cent from August totals, it is entirely possible that the margin may be decreased by production increases during the month as was the case in August. Tentative schedules early in that month called for slightly less than 200,000 units whereas the revised reports indicate an actual output 15 per cent in excess of that estimate.

Early sales reports for September indicate that new car sales are holding up well with little seasonal tapering off beginning to be felt as yet.

Individual company reports follow:

Shipments of new DeSotos during August exceeded the July total by 136 cars. Total of 3651 made it the best month for DeSoto since March last year. The company is now within 2000 cars of selling more cars in the last half of the year than in the first.

For the week ending Sept. 2 DeSoto reports deliveries of 820 cars, an increase of 17 per cent over previous week and 121 per cent over last year. DeSoto dealers also set a new high record in used car sales.

Plymouth reports sales for the week ending Aug. 26 of 7059 cars and indications that August will show new record for this season of the year.

Dodge cars sold during the week ending Sept. 1 totaled 3029, a 22 per cent increase over previous week. Trucks with deliveries of 867 show an increase of 9 per cent. Total Dodge retail domestic deliveries to Sept. 1 amounted to 57,728 as against 20,872 for the same period last year.

Chevrolet with a total production of 73,433 cars and trucks, registered the best August since 1929 with an increase of better than 200 per cent over last August. This brought production totals this year to 511,433.

Graham Paige with August shipments of 1254 cars bettered its showing for July of this year. It represents the best August for Graham in three years, and with the exception of June was the best month for Graham this year.

Shipments of cars by Hupmobile during August totaled 675 units, more than double August of last year. Export shipments this year to date are 36 per cent ahead of same period in 1932.

Packard 1934 Models Are Priced Higher

DETROIT—Prices on all body types of the new series of Packard eight and super-eight cars described on pages 300-302 of this issue, are increased $200 over previous lists, with the exception of two models. The Packard eight coupe roadster is increased $330 and the Packard eight limousine, increased $240. Both of these models are furnished on a longer wheelbase than formerly.

Prices of Packard twelve models are increased $100 over previous lists with the exception of the coupe roadster, for which there is no change in price. Following are new prices for various body models:

	Packard Eight Model 1100	Super Eight Model 1103	Packard Twelve
5-pass. Sedan	$2,350	$2,950	
Model 1101		**Model 1104**	**Model 1107**
5-pass. Sedan	$2,585	none	$3,960
Formal Sedan	3,285	$3,800	4,660
Club Sedan	2,670	3,255	4,060
5-pass. Coupe	2,640	3,180	3,990
2-pass. Coupe	2,550	2,380	3,820
Coupe Roadster	2,580	3,070	3,850
Touring	2,590	3,180	3,980
Phaeton	2,570	3,090	3,890
Sport Phaeton	none	3,350	4,190
Conv. Victoria	2,980	3,640	4,590
Conv. Sedan	3,090	3,790	4,750
Model 1102		**Model 1105**	**Model 1108**
7-pass. Sedan	2,655	3,290	4,185
Limousine	2,790	3,480	4,385

Johnson Says Court Action Will Follow if Ford Violates the Automobile Code

NRA Says Ford Is Under Code Whether He Thinks So or Not—Collective Bargaining Provision Is Major Objection—Wage Scales Are Being Revised Upward

WASHINGTON, D. C.—Failure of the Ford Motor Co. to comply with the N.A.C.C. will be met by legal action in the Federal courts in Detroit, Gen. Johnson revealed late Wednesday.

According to the National Recovery Administrator, the Ford company is under the code whether Mr. Ford thinks so or not. He said that the automobile code has been approved; that it was presented by an officially truly representative organization and that consequently the Ford company automatically comes under it as the "law merchant" of the industry. Compliance with the code involves not only meeting its hour, wage and collective bargaining features, but also the filing of such statistics with the N.A.C.C. as the code provides for.

Meanwhile up to press time (Thursday A. M.), Mr. Ford has maintained an impressive silence.

Action against the Ford company to force compliance apparently hinges on evidence of violation as the attitude of NRA seems to be that so long as Ford meets code requirements, his

(Turn to page 320 please)

Business in Brief

Written by the Guaranty Trust Co., New York, exclusively for Automotive Industries

Industrial activity continues to show signs of recession, but wholesale and retail trade volumes appear to be well maintained. The price movement last week was indeterminate, with declines in some groups and advances in others. The security markets also showed an irregular tendency without any definite upward or downward trend.

Slight Drop in Car Loading

A slight recession occurred in railway freight loadings during the week ended Aug. 26. Loadings in that period totaled 631,998 cars, as against 634,845 cars in the preceding week and 537,973 cars in the corresponding period last year.

Power Production Still Up

Production of electricity by the electric light and power industry for the week ended Aug. 26 was 13.5 per cent greater than in the corresponding week of 1932. This was a somewhat smaller gain than was reported for the preceding week, when output exceeded last year's comparable figure by 15.2 per cent.

Lumber Shipments Drop

Orders booked at the lumber mills during the week ended Aug. 26 were the lowest reported since last May. Production was 5 per cent below that of the preceding week and was nearly equal to the record rates of July and August. Softwood orders were 28 per cent, and hardwood orders 22 per cent, below output.

Oil Output Steady

Average daily crude oil production for the week ended Aug. 26 was 2,756,400 barrels, as against 2,766,500 barrels for the preceding week and 2,114,000 barrels for the corresponding period last year.

Commodity Prices Rising

Professor Fisher's index of wholesale commodity prices stands at 70.8 for the week ended Sept. 2. This compares with 70.4 a week before, 70.3 both two and three weeks before, and 70.6 four weeks before, prior to the July reaction.

Bank Deposits Increase

Bank debits to individual accounts outside of New York City during the week ended Aug. 30 were 3 per cent larger than during the corresponding period last year. A week earlier, the total exceeded that for the similar period of 1932 by 11 per cent.

Federal Buying U. S. Securities

A further increase of $35,000,000 in holdings of government securities was reported by the Federal Reserve banks for the week ended Aug. 30. The daily average volume of Federal Reserve bank credit outstanding during that week was $24,000,000 larger than in the preceding week but $64,000,000 smaller than in the corresponding period last year. In addition to the increase of $35,000,000 in securities, there was a rise of $3,000,000 in discounts, resulting in an advance of $38,000,000 in total bill and security holdings. Federal Reserve note circulation declined $11,000,000 and reserves $5,000,000, while deposits rose $41,000,000. The reserve ratio declined from 67.9 to 67.5 per cent.

Wilson Foundry Resumes

PONTIAC, MICH.—Production has been resumed Monday at the plant of the Wilson Foundry and Machine Company on engines for Willys Overland, to be assembled into trucks for the International Harvester Corp. It is reported the order calls for approximately 4500 units, which will be spread over about two months.

In recalling men to work President D. R. Wilson announced that 20 per cent wage scale increases for both factory and office employees would be

A.S.S.T. to Change Name

CLEVELAND, OHIO — American Metals Society will be the new name of the American Society for Steel Treating if the recent unanimous resolution of the Society's board of directors is ratified by the members. The next step will be to refer the resolution to the Society's Constitution and By-Laws Committee at the forthcoming annual meeting in Detroit, Oct. 2-6, for putting into proper phraseology as an amendment to the constitution.

NRA Gives Truckers Exceptions to PRA

Revisions in President's Agreement Enables Haulers to Get Blue Eagle Insignia

WASHINGTON, D. C. — N.R.A. headquarters has approved exceptions to the President's Reemployment Agreement for the trucking industry, permitting those who comply to display Blue Eagles.

The substitute agreement establishes a 48-hour week, averaged over a three-month period, for drivers, helpers and dispatchers, with minimum wages of 40 cents per hour, except hourly rates established prior to July 15, 1929, which may be continued subject to an absolute minimum of 30 cents per hour in the North and 25 cents per hour in the South.

Because of the difficulty of controlling hours of work on intercity or line hauls operators in this service may elect the hourly basis or a mileage ratio. In the latter case 720 miles of travel is considered the equivalent of a week's work for a tractor, semi-trailer and extra trailer train; 960 miles for a tractor and semi-trailer or truck and trailer, and 1060 miles for a truck. The maximum of 48 hours per week average for three months shall not be exceeded. The hour provisions do not apply to managerial employees receiving more than $35 per week, nor to employees or emergency repair work, outside salesmen, watchmen or station managers.

These labor provisions will apply pending the approval of a general code for the industry, with supplements for various special cases. Truck operators with contracts with labor organizations calling for longer hours must file individual exceptions with the N.R.A., asking for permission to employ for the hours specified in the agreement.

Sugar Codes Call for Regulation of Trucking

WASHINGTON, D. C.—Motor carriers transporting sugar will be required to file rates, terms and conditions for the transportation and handling of sugar, under the provisions of the marketing agreements and codes of fair competition filed respectively by the cane and beet sugar industries. Changes in rates, terms and conditions also must be filed.

Both agreements require the sale of sugar at delivered prices which shall be the base price plus the lowest standard all-rail freight rate. However, when the all-rail rate is higher than the truck rate, the boards of directors of the respective cane and beet sugar associations may authorize and fix a lower transportation rate for use in figuring delivered prices.

Haulers Protest Cuts In Rail Freight Rates

Federated Associations Complain to Eastman on Non-Compensatory Rates

WASHINGTON, D. C.—A strong protest against the practice of the railroads in cutting rates below cost to meet or forestall truck competition was made to Federal Coordinator Joseph B. Eastman by a committee representing the Federated Truck Associations of America. The truck representatives pointed out that cost of truck operation would be increased by the terms of the blanket exception to the President's Reemployment Agreement which had been approved by the N.R.A.

The Federated Associations also asked intervention by President Roosevelt on behalf of truck operators in Texas, Tennessee, Louisiana and Kentucky, which states limit sizes and weights of trucks so drastically that the margin of profit for for-hire operators is so small that "the increased costs arising from compliance with the Blue Eagle program will put them out of business. This request was forwarded through Secretary of Agriculture Wallace.

In states in which there is more than one association of truck owners a state federation of associations may be formed, and this federation will hold the state membership in the Federated Truck Association of America. State federations have been organized in Ohio and California.

Truck Code Filed By Highway Assn.

WASHINGTON, D. C.—The American Highway Freight Association has filed a tentative code of fair competition for the trucking industry following discussion during sessions lasting several days. The code is intended to be a master or "shell" code covering all classes of operation to which amendments will be filed to cover particular conditions in various regions and the sundry classes of trucking. The code applies to the "carriage of property for hire by means of motor vehicles, drays and teams."

The code contains the "merit" labor clause similar to that in the automotive industry code. All of those engaged in the industry are required, under the provisions of this tentative code, to register with the local administrative agency of the American Highway Freight Association and to "bear their shares of the expense of administration."

Ted Rogers, Scranton, Pa., who is president of the Pennsylvania Motor Truck Association, was elected president. Other officers elected are: First vice-president, C. S. Reynolds, Tacoma, Wash.; second vice-president, Foster Moreton, Detroit, Mich.; third vice-president, Sydney Allen, St. Petersburg, Fla.; secretary, Marion F. Jones, Denver, Col.; treasurer, Robert K. Carter, Richmond, Va.

Chevrolet Ships 38% More by Rail

DETROIT—Chevrolet Motor Co. in the first six months of this year moved by railway freight 69,596 full carloads of incoming materials and outgoing finished parts and automobiles. This represents an increase of 38 per cent over the full carload movement in the same period last year, according to C. R. Scharff, Chevrolet traffic director, and does not include 72,000,000 lb. of railway freight carried in less-than-carload lots, an additional 2,100,000 lb. moved by railway express and 24,000,000 lb. by freight forwarders.

Mr. Scharff stated further that 65.3 per cent of all freight handled by Chevrolet in June was moved by rail.

Ball and Roller Bearing Manufacturers File Code

WASHINGTON, D. C.—Sales below cost, defamation of competitors, enticing of employees of competitors, rebating, misrepresentation, commercial bribery, etc., are among the unfair trade practices listed in the code of fair competition filed by the anti-friction bearing industry. The code, which covers the making and selling of anti-friction bearings of the ball or roller type, or any of their several parts, was filed by the Anti-Friction Bearing Manufacturers Association, with offices at Forty-third Street and Madison Avenue, New York City. Basic hours are set at 40 hours average and minimum wages at 40 cents.

New Nash Models Coming

CHICAGO—Early introduction of new Nash models was announced on Sept. 2 at the company's exhibit at the Century of Progress. Four of the 16 1933 models which form the endless chain in the Nash Tower have been removed and in their place are announcements of the 1934 line. The initial showing will be made at the Century of Progress.

Vascoloy-Ramet Formed

Vascoloy-Ramet Corp. has been organized for the manufacture of all grades of tantalum carbide and the production of all kinds of tantalum carbide cutting tools, dies, wearing surfaces and similar products. In this company the tantalum carbide manufacturing divisions of the Vanadium-Alloys Steel Co., Fansteel Products Co., and the Ramet Corp. of America are combined.

Price Problems Still Puzzle Steel Makers

Code Obscurities Block Placing of New Orders

NEW YORK.—Steel consumers as well as producers have shelved thoughts of new business, in so far as it is at all postponable, until after all the pieces in the puzzle presented in many respects by the Code price structure have been put together. For their current needs automotive steel consumers mostly have backlogs to draw upon and, in a few instances, small reserves accumulated in the last few weeks.

One of the most difficult nuts to crack in the interpretation of the Code is that surrounding the variables in the perfectness of body stock. Uniform perfectness, being largely a matter of selective culling, is so relative a problem that absolutely governing definitions are hard to formulate.

The explanation for the immediate advance of $3 a ton in the price of cold-rolled sheets is that while competition among rollers was much more keen than it is now some of the latter marketed a grade of "mill run" sheets at a concession that in some instances amounted to as much as $4 a ton from the regular quotation for cold-rolled stock. If such run-of-mill material is now to be outlawed and only fully inspected sheets can be sold, the advance to the most favored buyers who were not quite so fastidious about uniformity as others would be $7 per ton.

Steel sellers emphasize that the Code provides for a $500 fine to the Government and $10 a ton "as and for liquidated damages" to the American Iron and Steel Institute for any violation and that, once the provisions are clearly defined, they must and will observe it down to the minutest detail.

Against this, certain consumers make the point that if a body maker finds it more advantageous to buy sheets at a somewhat lower price than that of fully inspected material, even though it entails a somewhat higher fabricating expense, it would be an uneconomic procedure to deprive him of this opportunity. These and many other kinks under the new Code regulations remain to be ironed out.

Pig Iron—With authorization to book fourth-quarter business at the last prevailing prices for pig iron, sales agencies had a clear road ahead, but very little representative business has so far been placed.

Aluminum—Steady and unchanged.

Copper—The market opened quiet and unchanged at 9c. delivered Connecticut Valley point, on Tuesday.

Tin—Further weakening of the dollar in terms of Sterling exchange caused Straits tin to advance ¾c over last week's close, when the market resumed business Tuesday morning. Uncertainty overhangs the duration of restrictions placed on production and marketing by agreement among tin-producing countries, acute differences of opinion being reported between the Dutch and the Bolivians as well as to some extent between the Federated Malay States Government and the other signers of the restrictive pact.

Lead—Unchanged.

Zinc—Unchanged and steady.

Studebaker Has Operating Profit of $187,493 and Cash Increase of $1,368,787 in Second Quarter

STUDEBAKER — Studebaker reports for the quarter ended June 30, 1933, net operating profit of $187,493 after the addition of $33,277 interest received and the deduction of $159,255 for depreciation, repairs and replacements, but before depreciation on plant and property. This compares with a net operating loss in the preceding quarter of $1,329,067 before depreciation and interest which brought the total loss for the first three months to $2,046,598.

The receivers also report that cash increased $1,368,787 during the second quarter, bringing the total to $2,406,789.

The report covers Studebaker, Rockne and subsidiaries except White and Pierce-Arrow. The company's share in the second quarter losses of the two latter corporations amounted to $756,329 as compared with a share in losses amounting to $1,109,609 in the first quarter.

Sales in the second quarter amounted to $9,522,886 as compared with $7,228,860 in the first three months of this year.

Current assets total $8,640,041, as compared with $7,566,830 on March 31, and include cash of $2,406,789, of which $246,584 is impounded pending litigation, cash in closed banks less reserves $170,433, marketable investments $45,509, sight drafts $527,225, trade accounts and notes receivable less reserves $487,081, other receivables less reserves $588,134 and inventories of $4,414,870.

Current liabilities total $3,029,349, as compared with $1,751,057 on March 31, exclusive of claims against the receivership amounting to $21,576,348. A comparison of these claims follows:

	June, 1933	March 1933
Bank loans, unsecured	$3,629,148	$3,744,022
Accounts payable	2,115,512	2,333,277
Accruals	726,318	990,149
Res. for Material com. canc.	244,319	244,319
6% Gold Notes	14,861,050	14,861,050
Total	$21,576,348	$22,172,816

The balance sheet puts the net worth of the corporation at $69,180,361, which compares with $69,816,001. Plant and equipment less depreciation was carried at $49,663,041, which in the opinion of the receivers is substantially in excess of actual values.

Johnson Says Court Action Will Follow

(Continued from page 317)

formal subscription to the document is not vital, except he will not get the "Blue Eagle" if he does not sign. The fact that the Ford company is operating a 40-hr. week does not in itself constitute a violation of the code, although Gen. Johnson was quoted, probably incorrectly, as having said that it did. The code calls for an average week of 35 hrs. between the effective date and December 31, 1933 and consequently with the normal seasonal contraction in production, it is quite possible that Ford will meet the average despite present operation on a 40-hr. basis.

Collective bargaining is regarded as the real obstacle to Ford participation. Speculation that Ford's alleged unwillingness to submit required statistics to the N.A.C.C., is also a reason for his attitude, may be discounted 100 per cent. Ford is a member of the Chamber through Lincoln, his representatives sat in on the formulation of the code, and he exchanges production and other data regularly on both Ford and Lincoln with the N.A.C.C. Consequently attempts to make this phase of code participation a major factor in the situation, seem ill-founded.

During the week, comprehensive upward revisions in Ford pay scales have been reported at the Ford plants. One increase is said to have involved 10,000 employees whose pay was raised from $4 to $4.80 per day. These adjustments lend weight to the view that Ford plans to go the N.A.C.C. code at least one better in the matter of pay and hours.

Of course, if the Ford Motor Co. does not subscribe to the code even though it complies with its terms, it will not be permitted to display the "Blue Eagle." Aside from the fact that the United States and some States have ruled out purchases from those who do not have the "Blue Eagle," how important the lack of the "bird" will prove to be generally depends on the effectiveness of the boycott. If Ford more than meets the hour and wage requirements, that the public will discriminate against his products because of his failure to sign the code, is at least open to some question.

Opinion within the industry on the subject is divided. In some quarters he is being commended for his courage in resisting the pressure on him, while elsewhere he is being criticized for his failure to go along.

Ford dealers apparently are destined to play the role of the innocent bystander if the company fails to qualify for the "Blue Eagle." Individually they can display the NRA insignia by signing the President's Reemployment Agreement and such display probably will be helpful in some degree in offsetting any adverse sentiment which may be created against Ford products. Where dealers do get the "Blue Eagle" individually an interesting situation will be created by the fact that the blanket code includes an agreement "To support and patronize establishments which . . . . are listed as members of N.R.A." Inferentially this might be interpreted as meaning the withholding of patronage from establishments not so listed.

While Gen. Johnson has said that if Ford violates the code, he would be forced to act, there is nevertheless the feeling here that court action again Mr. Ford is unlikely. The government wants cooperation. It does not want trouble. It wants to reemploy workmen. It does not want to add to the already tremendous unemployed list.

Knudsen Speaks at Steel Meeting

DETROIT — Chevrolet president, W. S. Knudsen, was scheduled to speak Saturday, September 9, at a dinner meeting of some of the country's large steel consumers with leaders in the steel industry. The meeting is to be held under the auspices of the Iron and Steel Club of Detroit at the Indianwood Club. Henry Roemer, president of the Sharon Steel Hoop Co., will act as toastmaster and will introduce Charles M. Schwab and Mr. Knudsen.

Wood Wins Harmsworth Race at Part Throttle

DETROIT — Using the same boat and engines with which he won last year's British International Trophy or "Harmsworth Trophy" race, Gar Wood was never extended to retain the cup in either last Saturday's or Monday's heats.

Wood's Miss America X last year was clocked officially at 124.5 m.p.h. on a speed trial on the St. Clair River, where this year's race was held, and even at that time he did not have his engines above the 2500 r.p.m. mark. It is understood that his propellers are designed to permit a maximum engine speed of at least 2600 r.p.m. and possibly more. During Monday's heat, which was the only one of the two which developed a semblance of a race, Orlin Johnson, who handles Miss America's throttle, never had the engines above 2100 r.p.m., and most of the race was run at around 1800 to 1900 r.p.m. At 1900 r.p.m. Miss America's speed exceeded the full throttle speed of Hubert Scott Paine's Miss Britain III with her 1375-hp. single Napier. Wood's boat, of course, is powered with four supercharged and geared Packard engines, developing a total of somewhere around 6400 hp.

Wholesalers Asks Product Groups to Put Resale Price Maintenance in Their Codes

DETROIT—Cooperative action on unfair competitive practices between automotive wholesalers and parts manufacturers is seen as a possibility following reported tentative adoption in codes of such groups as piston, piston ring, piston pin and universal joint makers of a clause making it mandatory that all sales be made under contract and that such contracts should specify the resale price of the article by that customer. While this does not represent price fixing since minimum resale prices are to be set through individual agreements by individual producers and may vary according to type of outlet, it is felt that it will provide an enforceable legal means of preventing demoralizing price cutting by individual outlets. The net effect would be to prevent sales of such items as "loss leaders."

Adoption of such a clause is very much desired by automotive wholesalers, who have circulated resolutions at A.P.E.M. product group code meetings recommending its inclusion in the product group code. A further effect might easily be in the long run to reduce the differential between prices for the same part or item as sold by chain stores and through regular automotive channels. Neither the Joint Wholesalers' Industrial Recovery Committee nor the A.P.E.M had issued any statement in connection with this development up to press time.

Greatest Attendance at S.A.E. Congress

(Continued from page 316)

event the Guggenheim Medal was presented to J. C. Hunsaker while Hubert Sharlock awarded the prizes to the successful competitors in the Bendix Trophy Race. The principal speaker was H. G. Weaver, in charge of consumer research for General Motors, whose topic was "Tuning in on the Consumer."

"Progress in future automotive design will come," Mr. Weaver said, "not alone out of the research laboratories and engineering textbooks, but through a better understanding of the human factor. Research in the realms of the physical sciences must be supplemented with a more definite and systematic knowledge of the tastes and desires of the ultimate consumer.

"We are entering an era when fact finding will be more important than ever before, not only in its application to the physical arts, crafts and sciences, but fact finding as applied to the tastes and desires of the ultimate consumer," Mr. Weaver continued. "And so it is with these thoughts in mind that General Motors invites motorists to give it the benefit of their ideas—to pool their practical driving experience with the engineering and manufacturing skill of its factory organizations."

Most of the papers presented at the Congress were digested in August 26 *Automotive Industries*. Additional digests appear in this number and the remaining papers will be covered in forthcoming issues.

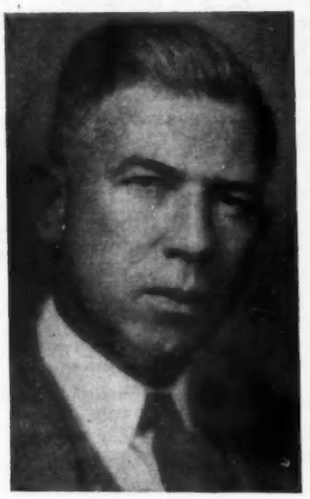
New Reflex Reflectors

FLINT, MICH.—A brand new line of Reflex signals with black duco bezel, a companion line to the chrome plated AC reflex signals, but priced much lower, is announced by AC Spark Plug Company. The lower-priced line was introduced to widen the reflector market.

Chevrolet Names Wright

DETROIT—Appointment of Ellery L. Wright as acting manager of the Chevrolet Commercial Body Plant at Indianapolis, succeeding J. A. Jamieson, deceased, was announced today by W. S. Knudsen, president of Chevrolet Motor Company.

Mr. Wright recently opened and operated the Chevrolet assembly plant in the special General Motors exposition building at the Chicago World's Fair. In his new post he will continue to supervise the Chicago plant until the close of the fair, as well as have charge of operations at Indianapolis.



Ellery L. Wright

New Office Building for Chrysler and DeSoto

DETROIT—Construction has been started on a new modernistic office building to house the Chrysler and DeSoto office force. The building will face on Jefferson Avenue and will be 501 ft. long. It will include display rooms for both Chrysler and DeSoto cars. The space now occupied by the offices of these two companies in the Jefferson Avenue plant will be devoted to production.

Hupp Management Policies Criticized in Letter Asking for Annual Meeting Proxies

NEW YORK — Management policies of the Hupp Motor Car Corp. are criticized adversely in a letter sent to stockholders by Frederick W. Burnside, Jr., asking for proxies for the annual meeting to be held September 13 at which three directors are to be elected.

Automotive Industries was unable to get any comment on the letter at the Hupp offices in Detroit in President Young's absence.

Mr. Burnside says in his letter that his contact with Hupp "came about through my engagement by the chairman of the executive committee to develop methods to increase Hupmobile sales. In a few months, with a small staff, I sold 12 per cent of all Hupmobiles in the New York metropolitan area, which has sixty distributor and dealer organizations."

It is understood that the chairman of the Hupp executive committee is A. M. Andrews, who, in addition to being a director of Hupp, is also on the board of the E. G. Budd Mfg. Co. and the Budd Wheel Co. Mr. Burnside does not reveal the methods used to sell the cars referred to above, but it is reported that his program involved the intensive use of the telephone and that neither the methods employed or the results obtained were regarded favorably in other quarters.

Incidentally, it appears from current listing of Hupp directors that A. J. Brosseau has resigned.

Pierce-Arrow Company An Independent Unit

Sold by Studebaker Receivers to Organization Headed by A. J. Chanter. Made Profit in Second Quarter

BUFFALO, N. Y.—Following the signing by Federal Judge Thomas W. Slick of an order authorizing the sale of the Pierce-Arrow Co. by the receivers of the Studebaker Corp., announcement was made by Arthur J. Chanter, president of the former company, that the Pierce-Arrow Motor Car Co. has been reestablished as an independent enterprise.

The Studebaker holdings are reported to have been purchased for $1,000,000 and other considerations.

The Pierce-Arrow Co. was not affected by the Studebaker receivership. The Studebaker Corp. owned all 230,125 shares of Class B Pierce-Arrow stock and controlled 23,500 preferred and 152,214 Class A shares as of Dec. 31, 1932.

The recapitalization plan provides for 750,000 shares of new $5 par value capital stock to be exchanged for the present preferred and Class A and B stocks. At the same time, 8900 shares of outstanding preferred stock are to be retired. Each present preferred share is exchangeable for 3.2 shares of new common stock; each Class A share for one-tenth share of new common and each Class B share for one-twenty-fifth share of new common.

The company's report for the quarter ended on June 30 showed net profit of $4,770, after all charges, compared with a net loss of $259,505 in the preceding quarter, and a net loss of $878,800 in the June quarter of last year. For the six months ended on June 30 the net loss was $254,735, against a net loss of $1,072,334 in the first half of last year.

Mr. Chanter will continue as president and will have associated with him Roy H. Faulkner, vice-president in charge of sales; B. H. Warner, vice-president in charge of operations; K. M. Wise, director of engineering and M. C. Ewald, treasurer.

Cooperating with the management of the company in the purchase and reorganization were a group of business men and bankers, many of whom have been affiliated in one way or another with the Pierce-Arrow Co. for several years. Among them are Geo. F. Rand, president of the Marine Trust Co.; J. F. Schoellkopf, Jr., Seymour Knox, and Roland Lord O'Brien. John Jay of J. & W. Seligman & Co. and Lester Watson of Hayden, Stone & Co. will continue as members of the Pierce-Arrow board of directors.

In announcing the reorganization of the Pierce-Arrow Motor Car Co., Mr. Chanter said:

"Since January, 1930, more than $2,000,000 has been spent on the improvement of our forty-five-acre plant. This plant is self-adequate, from the manufacture of engines through to the construction of bodies. We believe our position in the fine-car field is outstanding, both from the standpoint of facilities and product as well as public acceptance.

"Pierce-Arrow sales this summer have been twice as good as last year. Since 1928, our share of sales in the fine-car field has been doubled. With the replacement potentialities greater than they ever have been, we are confident of a progressive and remunerative future."

New Parking Brake on Chevrolet Trucks

DETROIT—A new parking brake hook-up has been released for production on Chevrolet 1½-ton trucks which cuts in the service-brake shoes as well as the parking-brake shoes when the hand-lever is pulled back. Installations of this brake system can be simply made in service by replacing the service-brake cross shaft and hand-brake pull rods with new units.

CALENDAR OF COMING EVENTS

SHOWS

Eastern States Exposition, Springfield, Mass. ..... Sept. 17-23
National Metal Congress & Exposition Detroit ..... Oct. 2-6
Automotive Service Industries Show, M.E.M.A., N.S.P.A., M.E.W.A., Chicago ..... Oct. 30-Nov. 4
New York Automobile Show, Jan. 6-13, 1934
Chicago Automobile Show, Jan. 27-Feb. 3, 1934

CONVENTIONS

Nat. Assoc. of Motor Bus Operators, Chicago ..... Sept. 21-22
National Metal Congress, Detroit ..... Oct. 2-6
National Battery Manufacturers' Association, Chicago ..... Oct. 19-21

MEETINGS

American Chemical Society, Chicago, Sept. 11-15
American Transit Assoc., Chicago, Sept. 18-20
National Petroleum Assn., Annual, Atlantic City ..... Sept. 20-22
Natl. Safety Council, Chicago.... Oct. 2-6
National Metal Congress, Detroit. Oct. 2-6
A.S.M.E. Meeting, Detroit, Wednesday, Oct. 4.
American Petroleum Institute, Annual, Chicago ..... Oct. 24-26
Commercial Motor and Transport Vehicle Exhibition, London, England ..... Nov. 2-11
International Automobile Salon, Paris, France ..... Oct. 5-16
International Automobile and Motorboat Show, London, England, Oct. 12-21

Schon Urges License Fees Based on Tires

Would Use Tire Makers' Rating as Fee Standard

PHILADELPHIA— Determination of the gross weight capacity of any vehicle for licensing purposes on the basis of the tire manufacturer's load capacity, is recommended by Pierre Schon, General Motors Truck Co., in the current issue of *Commercial Car Journal*.

He points out that tire ratings have been fairly well standardized by the rubber companies and that the truck maker's gross weight rating are controlled to a large extent by the load capacity of the tire equipment. Moreover, with pneumatic tires, overloading is so severely penalized by increased tire costs, that operators realize that it doesn't pay.

Mr. Schon contends that his proposal represents a more rational method of computing license taxes than the pay load, net chassis weight, net vehicle weight or gross vehicle weight methods now widely employed.

Although manufacturers generally, Mr. Schon says, are in favor of gross weight rating, he does not believe it should be used as a basis for license fees inasmuch as it is the practice now to establish different gross weight ratings for the same chassis depending on operating conditions, tires, etc.

Chevrolet Dealers Get M.E.W.A. Buying Guide

CHICAGO—A new catalog known as the "Chevrolet Dealers Buying Guide" is just announced by the Motor and Equipment Wholesalers Association, at headquarters in Chicago.

The catalog is the result of a plan of cooperation between M.E.W.A. and the Chevrolet Motor Co. for the equipping and tooling of Chevrolet dealer establishments. In the fore part of the book appear letters from both organizations addressed to Chevrolet dealers.

More than 10,000 copies of the catalog are being distributed by district managers of the Chevrolet Motor Co. to dealers throughout the United States and Canada. Copies have also been supplied to M.E.W.A. members.

Sweeney and Allen in New Service Co.

BOSTON—John M. Sweeney and Walter A. Allen, each of whom has had many years' marketing and advertising agency experience, have organized the Federated Sales Service, with headquarters at 537 Commonwealth Avenue, to bring together carefully investigated manufacturers' agents and manufacturers who are seeking wider and better distribution of their products.

"The best FENDER SHEETS we can Buy"

A LEADING automotive manufacturer recently made the statement that Republic fender sheets are the finest they are able to buy. And judging by the number of users, other car makers must feel the same way about it.

Republic has devoted extensive research to the development of better fender sheets—sheets with far above average drawing qualities, and a high finish. The time and money spent on this development has kept Republic fender sheets apace with the demands of designers. And now that streamlining has made fenders such an important part of the modern car, the qualities of Republic fender sheets assume greater importance from the standpoint of economical production. ¶ If you are not satisfied with the results you are now obtaining—remember this—you are not experimenting when you use Republic fender sheets.

REPUBLIC STEEL
CORPORATION
GENERAL OFFICES: YOUNGSTOWN, OHIO